

THE DENTAL PRACTITIONER

AND DENTAL RECORD

Including the Transactions of the British Society for the Study of Orthodontics, and the official reports of the British Society of Periodontology, the Glasgow Odontological Society, the Liverpool and District Odontological Society, the North Staffordshire Society of Dental Surgeons, the Odonto-chirurgical Society of Scotland, and the Dental and Medical Society for the Study of Hypnosis

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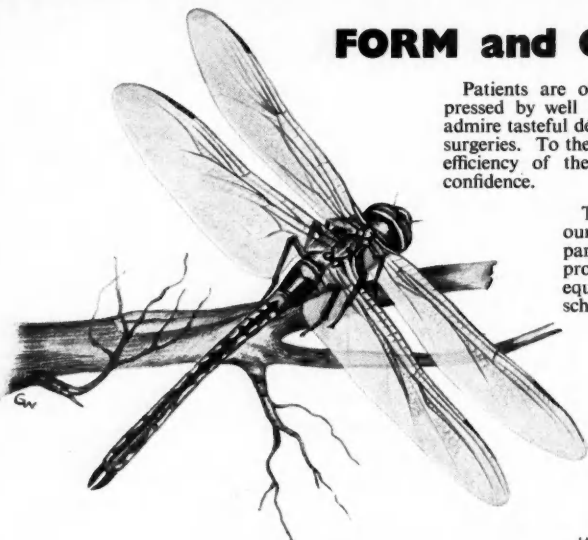


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THE DENTAL PRACTITIONER AND DENTAL RECORD

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EDITORIAL

DENTAL TEACHING

TO-DAY, in this country, a transition is taking place in dental teaching. The lack of practitioners, the plethora of would-be students, the building and rehabilitation of dental schools, and the general review of curricula all help to create modified chaos in the realms of dental education.

Teaching the modern dental student is no longer a simple matter. The emphasis at the present time is on providing him with a university education in general and a biological-dental education in particular. There is even dissension and discussion taking place over these sought-after standards. Some educators lean towards a "two-tiered" form of qualification, i.e., highly qualified dental surgeons backed by practitioners capable only of repair and replacement dentistry. Others oppose this suggestion, maintaining that it has proved unsatisfactory in a number of other countries which now are seeking to align their curricula more closely with ours.

The discussion continues.

In extension of this, it is hoped that the new schools will provide more students, and thus more practitioners, whatever final decision is taken. But are there sufficient numbers of teachers available? Even our dental schools hitherto have found difficulty in maintaining adequate staffs of high standard. The pay differential between private/N.H. practice and

teaching posts has stood our schools in bad stead, encouraging the newly qualified practitioner to use a teaching post as a stopgap until he has achieved a thriving practice, or, alternatively, if he has a leaning towards research, to take it because opportunities are more readily available within the framework of a school. Few qualified practitioners teach for the love of teaching—surely a disgraceful state of affairs when the future of the profession lies within their hands!

Is it not time that we considered teaching our teachers—training them responsibly and positively in the science of imparting knowledge?

Is it not also time that would-be authors of dental literature had the opportunity of learning the craft of preparing material for publication; indirectly as vital a source of dental education as the schools themselves?

These are but as a drop in the ocean of problems which beset those among us who are concerning themselves with the future of dental education in this country. Other aspects of the task may be found within the pages of this issue of *THE DENTAL PRACTITIONER*, which has been devoted to the subject of dental teaching.

Perhaps in airing some of the problems we may contribute in some part to the search for the answers.

THE UNIVERSITY EDUCATION OF THE DENTAL STUDENT

By N. LIVINGSTONE WARD, L.D.S., D.D.S.

Dental Sub-Dean, The London Hospital Medical College Dental School

THE primary function of a university is to teach and train undergraduates in order that on qualification they may hold responsible positions of authority and trust in the society in which they live. The life of a university is dependent upon its undergraduates, for if there were no undergraduates there would be no universities. To maintain a high standard of undergraduate and postgraduate teaching, it is essential that university teachers should know the modern developments in their subject and also be conversant with the world around them. The newly qualified university graduate is expected to be a person who throughout his life will be able to help raise the intellectual standard of the community, not only by his knowledge of one particular speciality, but by having acquired, through his university education, a breadth of mind that can be brought to bear on all the various problems of life. To achieve this standard, the university teacher must be intellectually qualified to teach and at the same time to develop his own speciality by research and inquiry. It is essential, then, that the universities supply the proper facilities for teaching students and for research and development by the staff.

In assessing this ideal state in relation to the university education of the dental student, it must be frankly admitted that we have a long way to go. However, this is probably true of many university departments and their undergraduates. Technically, the dental student is as well trained as any undergraduate in other faculties. It is doubtful if the rest of his education is anywhere near the standard we should aim for. It could, of course, be argued that this is really unnecessary and that technical proficiency is all that is required by a dental surgeon. In this case there would be little object in having a university degree in dentistry; all that would be required is a technical college education and the granting

of a diploma at the end of the course. It could again be argued that in some respects this is really what happens. This is precisely the greatest potential danger to the undergraduate dental student and to the dental profession as a whole. Technical proficiency is important in dentistry, but it is not by any means the be-all and end-all. Indeed, the future of dentistry is such that technical proficiency may have to be placed second to the practice of prevention. This is a principle upon which the future of dentistry must be built. It is, however, out of step with the trends of general practice under the National Health Service. The financial rewards of general practice lie in technical proficiency and manual dexterity, while advice and prevention add little to the salary of the dental surgeon. How far, then, should the university education of the dental student be dictated to by the demands of general practice?

Undoubtedly, the views of some general practitioners and university teachers are poles apart on what could become an explosive issue. To a certain degree general practice has already dictated some aspects of the modern dental curriculum, while at the same time the basic teaching of the dental student has dictated the future course of dental treatment in general practice. The general practitioner who says to his newly qualified assistant that he had better forget all about his classical cavity preparations if he wishes to earn any money is on the same level as the university teacher who thinks that the only really essential part of a dental student's education is an understanding of basic science and research methods. They are both wrong.

UNIVERSITY EDUCATION AND GENERAL PRACTICE

The main change in the dental curriculum that is slowly taking place due to the influence of general practice is in the attitude to

the teaching of dental mechanics. It is now rare for the general practitioner to undertake his own mechanical procedures, but he must still be acquainted with all these methods in order to instruct his technicians and follow through the procedures to completion. The amount of dental mechanics that a student should know is a matter of degree. However, it must be remembered that the reason for the reduction in the teaching of mechanics is not that the practitioner no longer performs these tasks, but that there is a body of men specially trained in dental mechanics to undertake them for him. It would be quite wrong to suggest that any part of the dental curriculum could be dropped merely on the grounds that certain techniques are only rarely performed by the general practitioner. Indeed, if this principle were carried to an extreme, the death knell of dentistry would sound in this country. To suggest that the curriculum should be based on the work carried out under the National Health Service would split the profession into two parts, from which they may never recover. The system of two-tiered dentistry has never been satisfactory, although it is still in existence in some countries. Most countries, including the U.S.S.R., are, however, hoping that the system will be abolished in the course of time. The university education of the dental student must never, under any circumstances, be dictated to by the demands of general practice. The curriculum of the dental schools must be devised so that students may be trained to the highest standards possible, compatible with the ability of the student. The university dental schools must be free to choose their own curriculum and to carry out the education of the student in their own way, providing always that they can prove to the satisfaction of their governing bodies that the dental student is educated to the high standards demanded by the dental profession. The dental schools must obviously take note of the changes in dental practice and, if thought desirable, alter the dental course in the light of these changes. They must also be able to revise their courses in the light of possible future changes.

To decide the elements of the dental curriculum, it is essential first of all to understand the aims and objects of the university education of the dental student. Basically, the dental student is being trained to take his place in the community as a member of a vast health team. Their particular responsibility is to maintain the dental health of the nation, either in private practice, general practice, hospital practice, practice in the armed forces or industry, the school dental service, or in a speciality. In addition, the course must be such that it can be used as a spring-board for the academically minded, as well as the future research worker. To devise a curriculum for such a diverse body of men and to include in it the opinion of everyone concerned is not particularly easy. University teachers are only human and there is always a possible tendency to think that their own particular speciality is more important than anyone else's. Hence the fact that dental schools must be free to express their own ideas on dental education. They must be free to experiment in order to achieve their ideals and ensure that a high standard of education is maintained. The dental student has to be trained not only for general practice, but to be able on qualification to choose any branch of dentistry he desires. The curriculum must be a basic training in dentistry at university level, not only for general practice, but for all branches of dentistry. The potentiality of the student should be discovered while he is still at the dental school, and his interests directed accordingly. It must always be remembered that the newly qualified graduate lacks one great quality that he still has to learn—experience. The young assistant must be taught by the principle, for experience comes with time and can never suddenly appear on qualification. How then can a curriculum be devised that will meet all these various requirements?

BASIC PRINCIPLES IN FORMULATING A CURRICULUM

In deciding a policy for the foundation of a curriculum some general criteria must be

established first. The subjects should follow a logical order throughout the course, so that the curriculum flows along connecting the subjects together in one theme. Sudden breaks to study a subject with no direct connexion to the subjects already learnt can lead to confusion in the student's mind. The best example of this is the teaching of dental prosthetics and mechanics between the pre-clinical course and the clinical course. In this case the student commencing his clinical studies suddenly finds he has lost contact with anatomy and physiology and has in fact to revise these subjects on top of all the new and complicated subjects of clinical dentistry. The clinical course should therefore commence immediately after the second B.D.S. examination. The student's knowledge of his pre-clinical subjects is still fresh in his mind and they merge from anatomy and physiology into applied anatomy and applied physiology on the clinical course. Each subject should be treated on this level, moving from one to the other in a logical sequence. The student should not learn each subject as an individual entity which can be neatly packed away in a "pigeon hole" with a high-sounding label. All the subjects he learns have a label, but at the end of the course he should only possess one "pigeon hole" labelled "Dental Surgery". One of the difficulties facing the newly qualified graduate is the fact that he is suddenly presented with a patient and has to diagnose and treat everything in the patient's mouth. In some cases this is the one thing he has never been taught to do. He has learnt a tremendous amount about dentistry in general, but has had little opportunity of putting it into practice all on one particular patient. The curriculum should be devised to overcome this problem and the final few months should be devoted to the carrying out of full treatment on each patient. If such a scheme is to be carried out, the order in which subjects are taught is of obvious importance. It is an accepted principle that the first subjects deal with the whole man and are incorporated into the pre-clinical studies—*anatomy, physiology, and dental anatomy*, and the various aspects of each. However, it is not enough to leave the dental students in a

medical school to study these subjects completely divorced from the atmosphere of the dental hospital. It is found that they take a much greater interest in the course if they see and inspect patients at this stage. Applied anatomy and dental anatomy can take on a new interest if the student can be instructed on the live patient. Once a student has seen an inferior dental nerve local anaesthesia injection he begins to realize the importance of knowing the exact anatomical relationship in that region. Once he has felt enlarged lymph-glands in the neck, his appreciation of physiology increases. There are, of course, other ways of stimulating interest in the pre-clinical year, but it is important that the student realizes the real reasons for learning these subjects at this stage and that it is not just another examination to pass and then forget. There is one other aspect of importance in relation to the pre-clinical studies. The student spends this year with medical students and is taught on parallel lines. The pre-clinical year is the basis of medicine, surgery, and dentistry, and there are good reasons for believing that they should be joined together during this period. This would mean that dental students take the same course as the medical students and all sit the second M.B. examination together. Having passed this examination they would then separate—one to clinical dentistry and one to medicine and surgery. In all probability this would enhance the status of the dental student and would present a better basic scientific training, but it would inevitably lead to a longer dental course.

THE INTRODUCTION TO CLINICAL DENTISTRY

Having passed the second B.D.S. examination, it is logical that the knowledge gained should be put into use immediately and not allowed to stagnate. The student is not only ready, but eager to see his first patients. He cannot, of course, treat patients at this stage, but it is essential that he should be in contact with patients during this initial period of clinical hospital practice. There is more than one method of initiating a student into the

mysteries of clinical dentistry, but all of them should be based on the patient, not on the workshop. One method is by the "Introductory Clinical Course", which is designed to bridge the gap between pre-clinical and the actual clinical treatment of patients by the student in the many and varied departments of a dental hospital. The idea of this course is to present a brief survey of the basic treatment carried out in each department. This enables the student to become acquainted with each subject in clinical dentistry; to see it as a whole and visualize the connexion between the different aspects of dental surgery. To understand basic treatment requires first of all a knowledge of the normal tissues in the oral cavity. The introductory course seeks initially to teach the recognition of the normal patient, both child and adult, and from a study of the normal appearance will branch out to a study of the abnormal and pathological. This teaching will be spread over the whole introductory course and must be considered as its key-point. The other subjects will radiate out from this centre in order of convenience. The phantom head course is the introduction to the whole of restorative dentistry; a course in scaling and simple oral pathology leads to an understanding of oral medicine and parodontology; the clinical course in the recognition of the normal in the child gives a basis for understanding dentistry for children and orthodontics; radiology, the technique of extraction, and the administration of local anaesthesia lead to oral surgery; and dental materials and simple prosthetic techniques to a complete course in mechanics and prosthetics. All these subjects at this stage will tend to overlap to a considerable extent. Radiology, local anaesthesia, and dental materials cover many departments and are taught on a wide basis. The clinical course will discuss caries and fillings on the patients while the students are commencing their phantom head work, and simple mechanical procedures will cover indirect inlays as well as orthodontic appliances and simple dentures. At the end of the course, the student will be able to commence treatment of a patient on a logical basis. He will be capable of scaling

the teeth, taking bite-wing radiographs, inspecting and charting the patient, administering a local anaesthetic, and completing the simpler restorative treatment for a patient. He will realize the importance of assessing the soft tissues of the mouth and know the value of oral hygiene. He will also have learnt the value of patient co-operation, and be able to tend to the needs of the child and the adult. He has at this point passed his initial training in the art of diagnosis, prevention, and treatment of dental disease, and may now move forward to the detailed consideration of every phase of dentistry.

THE CLINICAL COURSE

If this introductory period has lasted four to five months, it leaves a further three years of training in clinical hospital practice for the allied and scientific aspects of dentistry. While there can be no rigid rules in the order of precedence of teaching individual subjects, certain principles may be used as a guide. No course in any subject should be presented on a full-time basis unless it is only for a week or two as it is important that the student should be able to maintain contact with all his patients throughout the whole course, particularly the child patient. The course should be arranged for the student to commence treatment on children, for restorative treatment and orthodontics, at the outset, as well as adult patients for conservation, parodontology, and prosthetics. He should then be able to follow through his work until he qualifies, learning all the time. The periods spent in each department are usually divided into dresserships, when small groups of students are taught over specific periods of time. It is usually more profitable to spend two or three separate periods in each department over the three years' clinical training first as a junior and then as a senior, ensuring that, where necessary, they may revisit the department between these periods to check up on their patients. The organization of dresserships will obviously vary greatly in dental schools owing to the difference in space and facilities offered. There should, however, be a central theme running through the whole

course and some forms of logical sequence in arranging dresserships. In the general subjects pathology and bacteriology should follow the introductory course and be followed by medicine and surgery. In this way the examination in medicine, surgery, pathology, bacteriology, and pharmacology may be taken fairly early in the course, leaving a year or eighteen months to concentrate on all aspects of dental surgery. It also ensures that the knowledge gained in these subjects may be used in advanced diagnosis and treatment during the last year.

If prosthetics is taught as a dressership over separate periods of time covering the whole course, then so, too, will dental mechanics. Dental mechanics is a wide subject and serves many departments other than prosthetics. A laboratory has to carry out work for restorative procedures, orthodontics, and oral surgery, and there is a case for the modern dental laboratory in a teaching school to be divorced from the Clinical Prosthetics Department. It is attached to the Prosthetics Department from an historical point of view, when the majority of the work performed dealt with artificial teeth. It is suggested that what is really required nowadays is a Department of Dental Technology which would cover dental materials and dental mechanics to serve the whole dental school and dental hospital with central laboratory services. This would overcome the tendency to give priority in the laboratory to dentures and place the construction of full dentures in proper perspective. The type of course whereby a student commences his training on a patient with no teeth is illogical and out of place in modern teaching. Surely the student should be shown the child first, at the commencement of the clinical course, and the edentulous patient at the end. The provision of full dentures for a patient is an admittance of failure to maintain dental health and should never be given the importance that it has been in the eyes of the student. This is not to say that the teaching of this subject should be reduced or placed in a minor position in the course. The student must be taught throughout his course that it is his primary responsibility to

maintain the oral health of his patients, and to commence with a course on prosthetics seems to abrogate this principle.

Dental practice tends to follow along the lines of the students' teaching, and for too long they were taught that children's dentistry was difficult and child patients would be better left until the last month or so of the dental course. The result has been a lack of interest in the child and the building of a massive dental repair system under the National Health Service. The child grows to manhood and having received only a minimum amount of treatment, seeks, as an adult, the service of a dental surgeon to repair the damage. The returns of the school dental service show this all too clearly, and dental education must share part of the blame for this tragic picture. The modern dental school should devise a curriculum which has as one of its cardinal principles the teaching of dentistry for children and the oral health of the adult patient. Dental education is responsible for the whole future of the dental profession, for every dental surgeon must pass through the doors of a dental school and his opinions and ideas will be moulded by his university teacher. The university is also responsible for the selection of new members of the profession; they must be chosen wisely and carefully.

EXTRA-CURRICULAR EDUCATION

The acceptance of these ideas by the universities would indicate that the actual training of a dental student as a future dental surgeon is not enough. He must also receive a university education on a broad basis. In a crowded curriculum this may not be easy, but an attempt should be made to find sufficient time away from clinical dentistry for the student to follow other intellectual pursuits. These pursuits need direction and the task is made easier by the use of a tutorial system. The tutor should be appointed to guide the reading and activities of about ten students who are allocated to him for the whole course. Few students on entry to a university know anything about the real use of a library or a museum, or how to undertake

the writing of a paper. In addition to normal university facilities, every city has good reference libraries and museums of general interest, and the tutor should be able to teach the students how to make the best use of them. Regular seminars should be held, and the student should be encouraged to read prepared papers to his group, with the tutor acting as chairman on these occasions. A department of visual education can be of great help in this direction, as it is usually in touch with all the institutions and companies who make films. It is possible to have a monthly film show for students and to include many films of medical and general interest. It has been found that this type of film education is quite popular, as a large variety of films may be shown in a year. It has also been suggested that students should undertake a "research" project to bring out their capabilities and give them a wider interest in the field of dentistry. This is perfectly feasible, provided that it is used correctly. Unfortunately, the word "research" has been prostituted out of all recognition and is used nowadays to glamorize the daily routine of collecting facts and figures from experiments, many of which have possibly been performed years before. There is a word of truth in the saying that the post-graduate who copies from books is undertaking research, but the undergraduate who copies from books is just cribbing! However, pure research is fundamental to the life of a university and the student should receive some form of instruction in the basic ideas and techniques of this important branch of dentistry. The question as to the relation between teaching and research is difficult in most dental schools owing to the present shortage of staff and the one tends to distract from the other. The good research worker is not necessarily a good teacher (and vice versa), but there is an inherent danger of appointments being made on the value of research alone, although there may be more teaching attached to the appointment than research. If shortages of staff could be overcome, the undoubted solution would be the appointment of full-time research workers and full-time teachers, and each would make a

contribution to the life of a university. This would not stop the independently minded research worker from teaching if he so desired, nor the teacher from undertaking clinical investigation. Indeed, the full-time university teachers should be given about three sessions a week to devote to their own clinical or scientific projects, which would not interfere with the main research laboratories staffed by full-time research workers. There is no reason why senior students should not help in this type of work, for it is on this level that free interchange of thought between staff and student can take place.

The student learns a great deal by example, both technically and intellectually, and it is essential in this modern world that the qualified man is intellectually honest and the possessor of a high moral conscience. It is only by this means that a university education will have any meaning. Standards tend to drop under State control and it is to the university dental schools as well as the whole dental profession that we must turn to ensure that the newly qualified dental surgeon is made morally conscious of his responsibilities to society and not broken on the wheel of National Health dentistry.

The Logetron, a Method of Improving Radiographs

The Logetron is an electronically controlled reprinting machine which modifies contrast. It was first used to assist the interpretation of aerial reconnaissance photographs. A cathode ray scanning device examines the opacity of successive small areas of a negative. A positive or a print is then made using a "photo-multiplier" amplifying circuit which exposes new film or printing paper according to the photographic density of the individual small areas of the original negative. The result reveals detail which is imprinted upon the original film but not discernible to the human eye because of insufficient or excessive contrast.—BOURSELET, M. DE S. (1960), *Rev. franç. odontostomat.*, 7, No. 6, 1005.

M. PLEET

UNDERGRADUATE LECTURING IN DENTISTRY

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INTRODUCTION

RECENTLY in the dental literature there have been some articles on the place of the lecture in the undergraduate dental curriculum (Kramer, 1957; Scott, 1960; and Trott, 1960). These authors have generally agreed on the philosophy of what a lecture is and what one can lecture about in contradistinction to a travel talk, a sales commentary, or a purely didactic instructional period.

Clark-Kennedy (1959) points out that University Lecturers, Readers, and Professors are not appointed because of their aptitude in teaching undergraduate medical and dental students, but rather because of their scholarship. This must be patently clear to all of us who have graduated from a University, as most of us remember with delight the men who were superb lecturers, and shudder at the memory of the great bulk of men who were appointed to lecture to us on specific subjects; all of them no doubt excellent in their own field of study, but hopeless in presenting a lecture. Casting back our memory it would seem that the men who could lecture well had an indefinable gift for teaching. One is then inclined to feel that this must be an inborn characteristic, and that if one does not have this natural gift, then there is little that can be done about it. Although this is true to a point, there is little doubt that if a man really wants to improve his technique of lecturing, he must analyse closely all that he does from the time he starts preparing the lecture, until he finally walks out of the lecture hall at the end of the lecture.

It is therefore intended to discuss briefly what a lecture is, how one chooses lecture topics and prepares the material, and lastly, what result one may achieve after all this effort.

THE LECTURE

The undergraduate university lecture is a very old and honoured method of teaching. Through the centuries many aids have been

introduced to help the lecturer impart his knowledge and wisdom to those desirous of learning. To-day the lecturer has at his disposal illustrative material of all types: films, television, and coloured slides, and perhaps many of us become so obsessed with the tools of the trade that we forget the original purpose and method of lecturing.

The lecture is one of the means of imparting knowledge and wisdom. It is the only means whereby a group of students can see and hear a man, deeply versed in his own subject, discourse with a clarity of mind and a preciseness of language upon the vast implications of his subject. It is during the lecture that the students will see unfolding before them the vast frame of human thought and work in a particular field of study. The lecturer is chosen, rightly, by the University for his ability to expand the boundaries of knowledge. To do this not only must he know what has gone before, but how it relates to other subjects and what is looming into sight over the horizon.

It is therefore a place in the undergraduate's already full curriculum when time can stand still, and he can be stimulated to think and reason with the lecturer. The lecturer should produce a provocative and challenging mood in his audience. He should not only pose the questions, but show how they can be answered and why, and if they cannot be answered, why not. He does not have to cover the subject. This can be gathered from text-books and articles. The lecturer can take these facts and impart his own experience and insight into them, whether it be from clinical or laboratory research. The student audience can see and hear a man thinking aloud about the subject he loves and knows most about. It is a very personal and enriching experience to listen to men giving university lectures who really know and love their subjects. Whatever the subject may be, if the lecturer can stimulate

an enthusiasm in his students, then he has accomplished much.

The lecture then is the principal means of exposing the student to the search for truth, by showing him how a man skilled in his own subject examines the evidence which he has accumulated in his own mind by reading, carrying out research, and thinking.

CHOOSING THE LECTURES

It must be obvious from the preceding remarks that there are many subjects in the dental curriculum that are not suitable for lectures. This is true, and some other form of group instruction should be used in these cases. However, there are still a great number of subjects suitable for the lecture method, and one should utilize these periods to the full.

Keeping in mind what a true university lecture is, carefully analyse the titles of the lectures that make up the course. Some of the subjects that have been jotted down may be better presented by a film, clinical demonstration, or television—if this is so, then they should be crossed off the lecture list. For example, a lecture title may be "Gingivectomy". This could mean the technique of how one is done. This is not a lecture, but a period of group instruction which is better accomplished through some other medium. However, if the title is altered to "The Principles of Periodontal Surgery", then one does not talk technique, but discusses the rationale behind the therapy.

This may do one of two things: it may drastically reduce the number of true lectures that are given, or many of the subjects may be reduced in size to quite short lectures.

It has been traditional to consider that a lecture should last for approximately fifty minutes or an hour. The faster we get away from this concept the better. Granted many lectures may well take this time, but there are others which may be profitably given in twenty, thirty, or forty minutes, depending on the subject under discussion, and the scope the lecturer intends to give to this subject. It is far better then to prepare a lecture as a single unit, and use twenty minutes profitably, rather than try to throw three separate

lectures, which may have some link, into a jumbled mess for one hour. Each lecture should be a single autonomous unit. You should be able to pluck any lecture from the course and give it by itself, and it will still stand as a finished, polished, and rounded piece of work.

Remember in choosing one's titles and subjects for lecturing that one is not trying to impart a series of facts, techniques, or equations, but rather principles, concepts, thoughts, and ideas. If in the past one has used the lecture incorrectly, surgery at this stage may be painful, but the results later will be most rewarding. One may lecture on far fewer topics, but they will be more worthwhile both to the student and the lecturer. Have courage then, and carefully examine which lectures you give are true lectures of principles, concepts, and ideas. If some do not measure up to the standard you set yourself, discard them as a lecture, and try some other means of instruction.

PREPARING THE LECTURE

Having clearly made up one's mind which topics lend themselves to the lecture method and relegated all extraneous matter to some other form of instruction, one can set about preparing a lecture.

It must be presumed that the lecturer knows his subject thoroughly, and knows in his own mind the points which he wishes to make on any particular topic. The problem is to put these points into a digestible form.

First, one may consider a number of coloured beads, all of which have the same size central hole, and it is a question of picking the right size and strength of thread to put the beads on, and in the best order. So, one may have a number of closely related subjects one wishes to discuss; the problem one has to sort out is, what is the thread joining these subjects together? What is the underlying principle that makes it possible to consider these subjects in one lecture? For once having found the thread, the subject matter itself can be built up into a logical sequence. Here is the crux of the question, and one may have to sit and think, and juggle

around ideas in one's mind to find the thread. Secondly, one may consider the assembling of a goods train. A number of trucks, each containing a separate commodity, have to be linked together to make up the train. Similarly in a lecture, there may be a number of topics which one wishes to discuss, but there is no central theme; they are in fact separate entities and the question is how to link them together in a reasonable and logical sequence. Again, this will require careful consideration and juggling until the sequence appears right. Besides finding the sequence one has also to find a connecting link, otherwise the lecture will fall apart into numerous unrelated pieces.

Once the central core of the lecture has been established and outlined, then one can turn to the introduction and the finale. The introduction is often the most difficult part to prepare. Here in a few opening remarks the stage has to be set. The theme can be introduced and briefly explained, because what follows is an elaboration of the theme. Simplicity and clarity are essential at this point, because it is at this stage that the student will grasp the essential features of the lecture, so that all that follows is an elaboration of the introduction.

At the end of the lecture, the main arguments and principles should be drawn together, so that again the student can see, in a simple and clear manner, the conclusions that have been reached from the theme that has been developed.

Preparation of Illustrations.—Nobody will deny that, in this modern day and age, projection slides are an invaluable tool to the lecturer. Once the lecture has been prepared one can then consider what illustrations are required to illustrate the points that are being made. Lecturing from slides is a habit to be deplored, the slide is there to illustrate quickly and easily a point which cannot be clearly and concisely put into words, or illustrated on the blackboard. Those of us who have seen and heard Dr. H. Sicher, of Illinois, lecture on the anatomy of the temporomandibular joint know only too well how brilliantly and beautifully an anatomist who is also an artist can use the blackboard with such penetrating

effect. Few of us, however, can use the blackboard with the same calm efficiency as Sicher and many others, and slides are used to overcome this handicap. But, because slides are relatively easy to produce, one is inclined to be lazy about their preparation, so that the great majority of slides which are seen at lectures hinder the speaker rather than help him. The slide should be obvious and nearly self-explanatory if used after one has discussed and argued a point for some time in a lecture. To turn to the screen and to interpret the wording, or the graph lines, or the angle at which the photograph was taken, interrupts the progression of an argument and the building-up of the situation in the student's mind.

Graphs.—Graphs are a very dramatic way of illustrating particular points and are probably better drawn on a blackboard and built up as the lecturer proceeds with his argument. This is not always possible and one reverts to a slide. There are serious limitations to projecting graphs. The number of lines should be severely limited and each line should be quite distinctly different. The lettering and figures along the ordinates must be easily readable without straining the eyes or twisting one's head. The whole graph should be balanced in the centre of the slide and not cramped in one quarter or half. The sudden glare of black lines on a white background can be quite distressing, and the eyes have to accommodate themselves rapidly as one slide follows the next. It is suggested, therefore, that the background should be a light grey or a light blue, and the photograph taken with a colour film and not a black and white film.

Tables.—These are difficult to project, and it is very doubtful if a mass of figures on a screen conveys very much to the audience. Far better to turn the figures into a line or bar graph. The bar graph is useful, but again, if there are too many bars, too close together, and the printing is not legible, they lose their point. Again, it is better to use colour slides than black and white, but the coloured bars must harmonize, not only with each other, but also with the background—unless of course one wants to bring out dramatically one

particular part of the bar graph and highlight it in comparison with the remainder.

Clinical Slides.—Good colour illustrations of clinical conditions are a boon to the clinical teacher. One must beware, however, of overplaying the use of clinical slides in a lecture. A lecture is not a friendly fireside chat about "cases I have seen". Each slide that is used must illustrate a point of principle and not be just one of a series, either all on the same patient, or all on the same condition, but from different people.

GIVING THE LECTURE

Few of us can lecture without any notes at all. On the other hand one should not write out the lecture in full and then read it verbatim. There is a happy medium. The more experience one gets the fewer the notes one will require. To start with, the main headings should be boldly written, so that the sequence of events is clearly before one's eyes at a quick glance, but the elaboration of the subject, and the arguments one puts forward, should appear to be impromptu, even though one has thought it out clearly beforehand.

One should always allow fifteen to twenty minutes before the lecture to read through one's headings and notes to make sure the lecture is quite clearly implanted in the "mind's eye". Similarly at this time, one's slides should be checked, to see that they are ready for the projectionist, and that they are not only in the right order, but also the right way up, and clean.

The actual art of delivering a lecture varies from one person to another, and it is difficult to single out the features which go to make up a good lecturer. Besides knowing the subject thoroughly and its relationship to other subjects, so that the essential features of the arguments to be presented are clear in his own mind the lecturer must also be able to speak clearly, intelligently, and with enthusiasm. From time to time it has been suggested that the lecture should be recorded beforehand on a tape recorder and then played back. In the author's hands this is a most depressing exercise, but it is of value to hear idiosyncrasies of speech that may well annoy an

audience. Public speaking is a matter of self-confidence, and one way to improve is to see and hear men who are masters at it, such as good politicians, lawyers, and actors. Also, one can join a debating club and experience the cut and thrust of public argument. If one is not good at speaking then the only way to improve is to practise, and to learn from each experience. By observing other speakers, and watching the effect of one's own lectures on others, one quickly finds the common faults such as mumbling into the notes, talking too quickly, not speaking clearly and audibly, speaking in a monotonous voice, and so on. One must persevere with improving the art of speaking, for like social amateur golf, no sooner does one correct a "sliced" drive than another fault pops up; but by perseverance one can improve one's golf to a reasonable standard, and the same applies to lecturing.

Since we are in fact all amateurs there are two faults which are not only practically universal, but becoming more and more common. First, when one turns to draw a graph, or equation, or anything on the board, the class will immediately change their area of concentration from listening to watching, and you are wasting your breath to talk and draw at the same time. Draw and then talk, but do not try to expect the audience to take in two things at once. Secondly, as coloured projection slides have become practically universal in undergraduate teaching these days, more and more speakers turn to the screen when the slides go on and talk to the screen about what they see. Speaking with their backs to the audience, and usually in a low monotonous voice, such lecturers expect their audience to grasp from the back row some intricate point of diagnosis or anatomy.

Just as one must take great care in the selection and preparation of slides, so one must be equally if not more careful of using them at a lecture. Just as one appreciates a good wine, at the right time and temperature, with a good colour and fragrance, in a small quantity, so with slides. If a slide reinforces a point of an argument, then use it after the argument, not before or during the argument. If one slide proves the point, then do not use

five or six to illustrate the same thing. Clinical teachers love to show all the slides of any particular lesion on one patient—it does not prove anything except what a good photographer you have in the school. So limit the number of slides you use, and when you use them. Nothing can be guaranteed to drive a class to sleep quite so quickly as a continuous hour of repetitive slides. Either show small batches of three or four at a time, two or three times during the lecture, or use them at the end to sum up the lecture. Slides are a handy tool but they can easily be abused and misused. Used with careful forethought and planning they are invaluable; used indiscreetly and in too great a quantity they teach nothing.

Last but not least is the difficulty of getting the feel of the audience. We have all seen the good actor or comedian time his speeches or his jokes to get the right effect out of the audience. Most university lecturers are not particularly concerned about effect in the dramatic sense, but they should get the feel of their audience to see if they understand and appreciate the arguments that are being proposed. It is very easy to get so wound up with what one is saying that over half the class may be lost and have drifted into a mental haze. Hypnosis can eventually be induced this way and we must be careful not to do the same thing.

The audience then, after a particularly tricky piece of mental gymnastics, must be brought to life again. Some can tell a joke, others can illustrate their point by a good clinical case, or

apply what they have said in a practical fashion. No matter how it is done, an audience's reaction must be carefully watched, so that they do not lose track of what is being said.

One can go on *ad infinitum* on the do's and don'ts of lecturing, but in fact most of them boil down to using one's common sense. There is little doubt, however, that simplicity of language and clarity of thought are the hallmarks of the good lecturer. If at the same time one can engender enthusiasm and a desire in the students to find out for themselves, then much has been achieved.

Acknowledgements.—The author cannot claim that any of the thoughts or ideas in this paper are original. They have been gleaned over a period of years from men the author has had the pleasure of working under. All of these men have given their time to discuss the many problems which face the dental teacher, and to them I am eternally grateful. I must specially thank Mr. I. R. H. Kramer of the Institute of Dental Surgery, London, W.C.2, for reading the manuscript and offering some helpful suggestions, which have been included in the text whenever possible. His contagious enthusiasm for teaching and lecturing have been the inspiration for this and other papers.

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INTERNATIONAL COMPETITION FOR THE "GOLDEN WAX KNIFE 1961"

Plans for a second International Prosthetic Competition have now been completed and the awards will be judged in Turin (Italy) during a Congress to be held there from June 3 to 6, 1961.

The Italian Dental Technicians' Association organized the first International Competition in 1954, which was judged in Milan by a five-nation jury. There were 16 entries for the competition—11 Italian, 4 French, and 1

British. The entry by Mr. E. I. Spencer won for Great Britain the Second Prize, a gold medal and parchment diploma.

The competition is open to technicians from all over the world, and the entries will be exhibited at the Congress to be held in the Palazzo del Valentino in Turin. Dental technicians who are interested in either the Congress or the Contest are invited to communicate with the Hon. Sec., Sindicato Nazionale Odontotecnici, Gulliver Road, Sidcup, Kent.

AUTHORSHIP

By LESLIE J. GODDEN, F.D.S.

WRITING an acceptable article requires only two things of an author: first, that he has something of interest or importance to say; secondly, that in saying it he selects the best words and puts them in the right order.

What is interesting? What is important? The answers to these questions will vary according to the intelligence, occupations, and social activities of the readers. The life cycle of the intestinal parasites of the termite is of interest to zoologists and of very great importance to those who live in tropical countries, but to very few others. Much that may be of interest is of little importance and merely seems to keep our minds active without the necessity of mental concentration. Much that may be of importance we do not recognize as such until it is interpreted for us in such a way as to capture our interest.

For a dental journal the range of interest is defined chiefly by the occupation of its readers and only to a very small degree by their social activities, but still the range is wide. Reports of research (academic* or otherwise), dissertations on pathological conditions with their diagnoses and treatments, descriptions of techniques and the behaviour of new materials, details of interesting cases, accounts of journeys undertaken with a dental purpose, the wide field of the incidence of dental disease and public measures to prevent or treat it, the principles of dental health education: all these provide such a diversity of opportunity that almost no dentist with a sharpened pencil and a piece of blank paper need hold himself back from endeavouring to enter the literary field.

Believing that something he has learned, seen, or done could be of interest or importance to his colleagues, and having decided that he will write about it for publication, an author then has the labour of presenting it so that the reader will be instructed or entertained, or both, in such a way that he finds

the terminal sentence comes too soon. The ability to do this—that is, to choose the best words and assemble them in the most appropriate sequence—is just as important as having knowledge of the subject to be discussed. As with knowledge, it can be acquired by patient application; but to some it comes more easily than to others.

The selection of the best words for translating our fleeting thoughts into permanent fixed symbols is linked with imagination and respect for the language. Words are tools and should be treated as such. When they are misused they become blunt and valueless. Our language must grow and develop, but this should be by suitable additions and not by distortions. When our forefathers changed the meaning of “presently” to imply anything but the present, the language was not enriched. When we use “terribly” to describe something in which there is no terror, we similarly debase it and our vocabulary is not strengthened but enfeebled. Politicians and civil servants have so misused the word “priority” that it has lost its emphasis, and purveyors of entertainment are now at a loss to provide a suitable adjective for something which is really good. Those who have to invent new superlatives because they have killed the original ones by overwork deserve public censure.

Words are misused for various reasons. Apart from the common exaggerations (“millions” for “many”), puerilities (“jolly” for “very”), and superlatives without meaning (“the film of all time”), the indifferent author will endeavour to attract attention by compounding curiosities. The writer who has to distort words or beget bastard ones in order to produce his effect announces his own lack of literary skill. He should be able to make his point with the use of commonly accepted words, apart from those infrequent cases when an unusual one may give emphasis which no other could supply. To compound a word is usually unwise and only on rare occasions can

* “Academic. . . . Not leading to a decision; unpractical.” *O.E.D.*

it be done successfully. To write, regarding the necessity of using words correctly, "It is of fundamental importance to accuratize our script", is not acceptable: but the comment, "Each author should be an orthologist" would probably be a permissible fantasy, providing the joke once made were not repeated.

The best words in the English language are usually simple, and the use of strange, pseudo-scientific, or complex ones should be reserved for occasions when to do otherwise would seem pedantic. There have been movements to encourage a return to the vocabulary of our early English ancestors, but this is both unnecessary and limiting. Many concepts have arisen or become known to English speech since those days which cannot be conveniently expressed by other than Greek or Latin derivatives, and it is the adoption of suitable words from, or based on, other tongues which enables a language to develop. Nevertheless, the main body of any written work should consist of simple short words gathered into straightforward sentences.

Having in his head a varied vocabulary, an author uses it to produce a succession of impressions which will hold the attention of his readers. In speech we learn to assemble our words into attractive sentences so that the sequence of thought is maintained and our intention unfolds logically: but in speech there is added the personality of the speaker modulating the inflexion of the words and often supplementing their intent by facial expression. The written word stands bare and unsupported: the critical world can ponder over it at leisure, seeking its weak points, and discussing them without contradiction.

It may be that there are masters who can write as they think and straight away produce a manuscript both attractive and authoritative without the necessity of revision; but if they exist they are rare indeed. For the majority of us, if we wish to compose something which others will find of interest and perhaps of value and may even wish to read again, it is necessary to draft, re-draft, and prune relentlessly. We all can think more quickly than we can write, and as the mind travels ahead of the pen an hiatus in our written argument may

occur here and there; and while our thoughts hang about waiting for the written words to catch up they tend to explore side channels and thereby seduce the script into *non sequitur*.

The skilled author is not necessarily one with ideas in his head who can dash off a few pages of reasonably correct English; a brief glance at the published despatches of experienced journalists reporting in haste current events of general interest shows that only by such methods as using the present tense inappropriately, writing incomplete sentences, and compounding curious adjectives can the public be encouraged to read hastily-constructed prose. This sort of writing is doubtless appropriate for publications which are read and then thrown away. That which may be read more than once, which will lie upon the shelves of libraries, which may in later years be consulted and quoted, requires craftsmanship of quite a different order.

The craftsmanship required for reasonably good writing is attainable to a sufficient degree by most of us if we have the desire to acquire it and will school ourselves for its achievement. It needs some discipline of the mind to ensure that what is to be written is clearly planned, and then a self-critical eye which will examine the script some time after the enthusiasm of composition has temporarily waned, looking for incomplete expression of thought, lack of logical continuity, and, in particular, redundant phrases. This last is, for many of us, the most important. Some of those sentences which when first written seemed to be gilded with inspiration will a few days later carry the tarnish of superficiality: they should be discarded, but to throw them away is one of the hardest things to do.

Our writing is a permanent expression of our thought and provides a graphic illustration of our intellectual standards. Whereas extempore speech, not being edited by other than the orator's quickness of wit, may be excused its imperfections, especially if they arise from emotion, the written word, whether emotional or not, can be scanned for accuracy and clear expression. It is possible for script to be pruned or amplified, freed from illogical

sequence and obscure phrases. It can also be adorned with those valuable second thoughts which for so many of us are an improvement on our first ones.

Revision is not a simple task: on the one hand there is the necessity for clarity and simplicity; on the other, the danger of replacing spontaneity with pedestrianism and pedantry, and too much revision can obliterate the individuality which all sincere writing carries. That which is easy to read is hard to write and he is a fortunate man who can polish what he has written without effacing its hallmark.

If a paper has quotations they must be accurate. Do not alter a comma nor start with a capital unless the quotation has one. Do not indicate italics unless the author used italics. If a quotation does not begin with the first word of the sentence, or does not end with the last word of the sentence, insert an ellipsis. To be quoted accurately is a courtesy to which every author is entitled and to take pains in complying with this is a sign of good authorship.

The careful writer avoids the unnecessary use of italics for two reasons: they suggest that he feels he cannot make himself understood without shouting; they also imply that his readers are such morons that they cannot follow a straightforward argument. Italics are useful for such purposes as providing a category of symptoms, or of steps to be followed, and differentiating them from the main body of the text. Rarely should they be used within the text except for those foreign words the immigration of which is permitted by custom for a special service but which cannot yet be considered as nationals. The frequent employment of italics emasculates them and denotes an insecure argument.

Illustrations are necessary to most scientific or technical papers and should be used according to the requirements of the argument. If too few, the author's intentions may not be clear to the reader; if too many, the article becomes an atlas. There is nothing wrong with an atlas—unless it was intended to be an article.

When photographic prints are used they should be glazed.

Graphs or drawings may have to be reduced in size. Graphs, therefore, must have letters and figures large enough to suffer reduction and still be legible. Drawings must not have lettering extending laterally beyond the necessary minimum, or reduction of the width of the drawing itself may have to be greater than would otherwise be required. Never paste illustrations into the text or to cardboard. Send them loose with adequate stiffeners.

No good manuscript is likely to be rejected because some of these requirements are not met, but adherence to them simplifies the task of preparing the article for the printer and therefore may facilitate early publication.

Having completed his task and checked his typescript for accuracy of statement, being sure that he has said all he wished to say, filled with confidence that this is one of the best things ever produced on the subject, the author then has to approach his publisher's editor.

If the typescript is intended for a journal it is wise to find out whether there are any particular requirements, as journals vary in their customs: some require one copy; some two. There are also variations in the style of setting out references and it is helpful if the style required is used. All editors prefer copy to be typed double-spaced with ample margins on one side of reasonably good quarto paper, and the top copy must be sent.

The inexperienced author may regard the editor as his natural enemy. This is not so. An editor has two duties: first, to his publication; secondly, to his contributors. In most cases the interests of the journal and the contributor are identical: the article must be appropriate for the journal, otherwise neither the journal nor its readers will benefit. The subject must be well presented, or both the author and the editor will come to regret its publication.

An editor is always willing to help an inexperienced contributor. New contributors are as necessary to a journal as new patients are to a practice, and they will usually find that the advice they receive helps to produce

an article on which they can look back in later years with satisfaction. No editor likes to miss something which is good; nor does he wish to publish anything lacking in maturity or polish. He has the responsibility of making certain, so far as he can, that an article is presented in a style which reflects the most credit on the author.

Every editor prefers the typescript which neither his advisers nor he can fault and where the subject is appropriate and the argument is logically presented in simple English. These infrequent ones he handles with the respect due to craftsmanship and pencils his few instructions to the compositor with a feeling of gratitude.

If the editor has consultants of discrimination for every branch of dental science or technology there are occasions when even the experienced author, renowned in his subject, can receive suggestions which will lead to an

improvement in his contribution. Few can really judge what they themselves have written. Knowing what he intended to say, the author thinks he has said it: his mind bridges the hiatus, rationalizes the slightly obscure, overlooks the imperfect syntax, and does not notice an illogicality. It is the duty of the editor and his staff to safeguard the author against this by careful scrutiny and endeavouring to misunderstand. If one reader can misunderstand intentionally, a score will do so inadvertently.

Writing an article on any subject is a good exercise. It teaches the author by making him clarify his thoughts, sift his opinions, check the references he imagined he knew, discipline his English, and review his subject generally.

That which is well written confers a double boon; for in the words of Bacon, "Reading maketh a full man . . . and writing an exact man".

The Role of Root-canal Therapy in Preventive Dentistry

A conservative method is presented based on a full understanding of pathological and bacteriological influences. The method is not new, and due regard is paid to the work of Okell and Elliot on bacteraemia; to that of Fish and McLean on the distribution of oral streptococci in the tissues and also to Fish's concept of bone infection. Recently Grossman has supported Fish by showing again that micro-organisms are not disseminated into the blood-stream by trauma to the root canals of untreated pulpless teeth with periapical areas. Therefore, it is stated here, the all-important tissue in periapical involvement is the periodontal membrane and the results depend upon its reaction to irritation.

The first evidence of periapical involvement is seen radiologically as a thickening of the apical part of the periodontal membrane. Left untreated, this area could increase in size, and there are three conditions which could arise: (1) granuloma—the commonest, and it is a potential cyst if the inflammatory reaction persistently stimulates the epithelium; (2) periapical cyst—this could be called a

long-standing granuloma with an epithelium-lined lumen; and (3) chronic abscess.

Fish's experiment with a cautery applied to the gingival sulcus before extraction has shown that the living tissues round the root of a tooth with a periodontal condition, though chronically inflamed, are sterile. In view of this, apicectomy appears irrational in cases where root-canal therapy has been satisfactorily completed and only in the case of a cyst need the tissue be disturbed. Root resection is not to be performed and indeed the cementum has to be left undamaged in case its death occurs with resultant resorption.

These are the principles upon which root treatment is based and the technique includes the usual attendance to an aseptic technique, adequate débridement, irrigation, and sterilization, followed by a bacteriological check before placing the root filling. The choice of drugs is unimportant, provided they conform to the suggested requirements and do not produce sensitivity. The results in the table show that those cases with periapical involvement offer very little more difficulty than those without. —HALLIDAY, M. C. (1960), *Aust. dent. J.*, 5, 135.

G. E. B. MOORE

THE USE OF PLASTIC TEETH IN PHANTOM HEAD TEACHING

By DOUGLAS H. SHEPPERD, L.D.S. R.C.S.

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FOR many years extracted natural teeth have been set up in phantom head jaws and used as a medium for teaching cavity preparation. Most teachers have used only sound teeth, as the extent of caries is often so unpredictable

have proved most encouraging. They have many advantages, of which, apart from the obvious ones, the most important is that the student can be taught how to "plane" the cavity walls with his chisels.

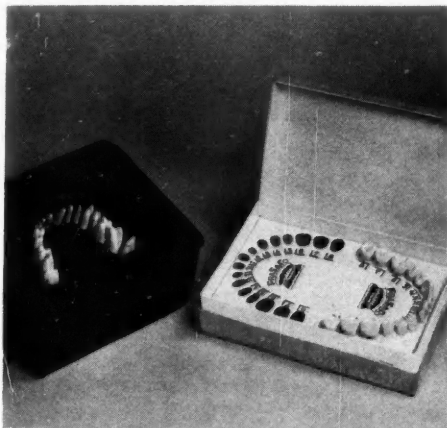


Fig. 1.—The plastic teeth in the mould.

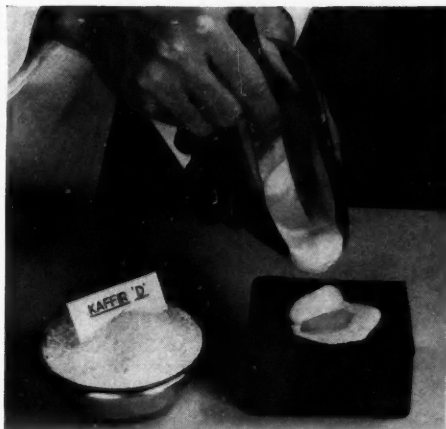


Fig. 2.—Pouring the model in stone.

as to make it impossible for a student to cut a text-book cavity. It is generally agreed that extracted teeth have many grave disadvantages:—

1. After extraction the teeth become hard and brittle, quite unlike living dental tissues.
2. A set of teeth collected from different patients is unmatched, and results in unnatural contact points and an irregular occlusal plane.
3. The enamel often fractures just as the student is laboriously finishing his restoration.
4. There is often a loss of occlusal contour due to attrition.
5. It is difficult to maintain an adequate supply of suitable teeth.

Some schools to-day have begun to use specially made plastic teeth, and the results

The only serious disadvantages are that all plastics are a little softer than living dental tissues, and there is no amelodentinal junction.

The latter difficulty can be overcome by teaching an adequate relative depth of cavity. The former is, in the event, a blessing in disguise, for it has been found less troublesome to change students from a soft to a harder substance when starting on patients, than the reverse process, as was the case when we were using extracted teeth. The relatively harder living tooth substance seems to eliminate the "bur-happiness" which we have all experienced with very junior students.

There are several brands of plastic teeth available, and before making a choice it is important to strike a nice balance between anatomical form, texture, and cost. The teeth used in this department are "Frasaco",

and are obtained through Messrs. S. S. White & Co.

The use of these matched teeth has enabled us to develop a technique which cuts out the unproductive labour of setting up individual teeth, and results in a standard set-up for use in the class, making it easier to compare the progress of individual students.

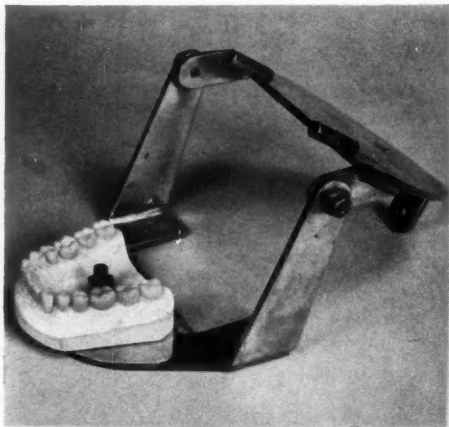


Fig. 3.—The lower model bolted to phantom head jaws.

A TECHNIQUE FOR SETTING UP THE JAWS

The teeth are placed in prepared moulds, poured in artificial stone, and the upper and lower models thus produced are mounted on

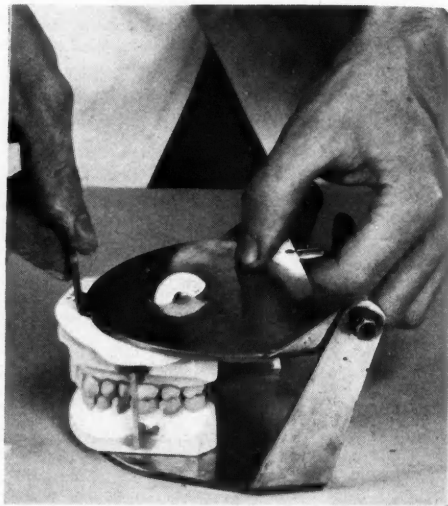


Fig. 4.—Articulating and locating the upper model to the maxillary flange of the jaws.

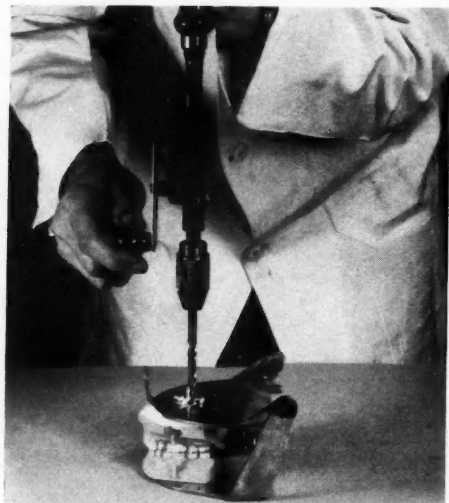


Fig. 5.—Drilling through the upper model.

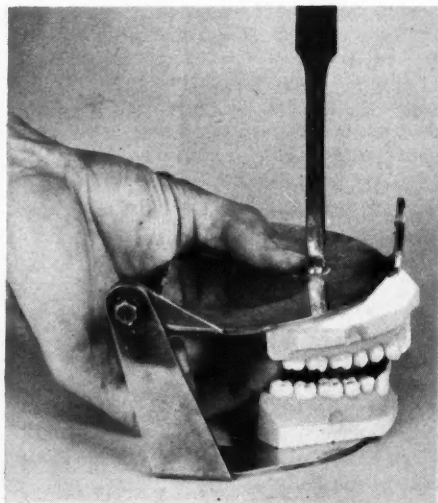


Fig. 6.—Bolting the upper model to the maxillary flange.

a phantom head jaw designed after the style of a plane-line articulator.

The principal difficulty encountered in devising this technique was to find a suitable material in which to make the mould. It had to be flexible, tough enough for repeated use, and, above all, dimensionally stable. It was found that "Vinamold", produced by Vinatex Ltd., Carshalton, Surrey, was eminently suitable. This material is based on vinyl resins, and is poured at about 130° C. over the plaster master model which has been sealed with a special varnish. In practice, it has been found that this mould is strong enough to produce about 40 to 50 models despite the rough usage of the average class.

The plastic teeth are now fitted into the mould (Fig. 1) and are poured in stone (Fig. 2), care being taken during vibration not to dislodge them, as their crowns only are held in the Vinamold.

The models are now trimmed and made ready for attachment to the specially designed jaws. A $\frac{1}{4}$ -in. hole is drilled in the lower model with a small wheel brace. It is then bolted to the lower flange of the jaw (Fig. 3) and the upper model is articulated with it and located with sticky wax. The upper flange of the jaws is then localized on to the upper model with plaster-of-Paris (Fig. 4) and, when this is set, a hole is drilled in the plaster through an existing hole in the upper flange (Fig. 5). A bolt is then inserted through this hole (Fig. 6).

When preparing models for advanced operative classes, it is not necessary to use a whole set of teeth. The required teeth and their immediate neighbours are quite sufficient, as the remainder will be reproduced in the stone model. For bridge work, if the root portion of a plastic tooth is removed, and the remaining crown is inserted in the mould as a "blank" (Fig. 7), it can be removed after casting, leaving a suitable space between the abutment teeth.

CONCLUSION

Before deciding to use plastic rather than extracted teeth, it is as well to reconsider the aims of phantom head teaching, and to assess

the relative merits of the two media. The aims of most teachers would probably be as follows:—

To teach:

1. Life-size cavity form.
2. The correct use and manipulation of instruments.

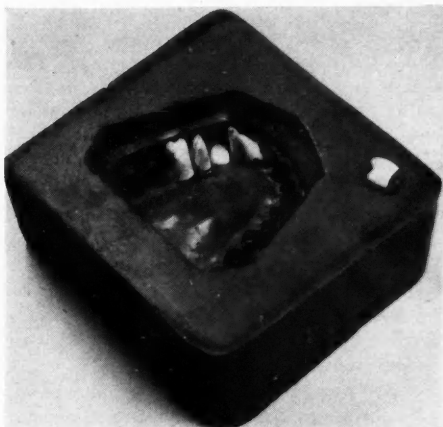


Fig. 7.—Teeth and blank for a bridge set up in advanced operative procedures.

3. The correct position and stance of the operator.
4. The manipulation of various filling materials.
5. The contouring of fillings.
6. The required standard of finish of the various fillings.

It is felt that, with these objects in view, the plastic tooth, although not a perfect medium, has many advantages over the extracted tooth, and that the few disadvantages can easily be overcome by slight modification of teaching methods.

The decision to make the changeover was taken at this Dental School some eight years ago, after very careful deliberation, but with considerable trepidation. This decision has never been regretted. The setting-up technique described above has been of immense value in facilitating teaching, and eliminating one of the major problems of the phantom head course.

TRENDS IN GENERAL ANÆSTHESIA FOR DENTISTRY*

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HISTORY

THE history of general anæsthesia in its earlier years was more closely linked with dentistry than with any other form of surgery. This is understandable, as at that time pain from dental decay probably afflicted everyone at some period or other during their lifetime.

In 1800 Humphry Davy, who was at that time Superintendent of the Medical Pneumatic Institution in Bristol, published his *Researches, Chemical and Philosophical, chiefly concerning Nitrous Oxide or Dephlogisticated Nitrous Air and its Respiration*. In one section of the book he describes his use of the gas in the temporary alleviation of the pain from an erupting wisdom tooth. He left Bristol, however, a year later and so the work was not followed up.

Meanwhile in the United States, itinerant, so-called professors of chemistry travelled from town to town lecturing on gases and demonstrating the exhilarating effects of nitrous oxide. In modern radio and television fashion they invited the younger members of their audience to take part in the demonstrations. It is easy to imagine how, under such circumstances, with no anxiety about pain, the name "Laughing gas" was coined.

In January, 1842, Wm. E. Clarke, a chemistry student, administered ether to a young woman at Rochester when one of her teeth was extracted painlessly by a dentist, Dr. Elijah Pope. This would appear to have been the first use of ether anæsthesia on record.

On December 10, 1844, Horace Wells, a dentist of Hartford, Connecticut, attended a lecture-demonstration on the effects of nitrous oxide and was so impressed that he arranged to have one of his own teeth extracted on the following day by a colleague, Dr. John M. Riggs, after whom alveolar pyorrhœa is named.

This was successful, and Wells then began to make and use nitrous oxide in his dental practice. He obtained permission to demonstrate extractions under nitrous oxide anæsthesia to the Medical faculty and students at Harvard Medical School. Unfortunately, the anæsthesia was too light. The patient, a student, cried out in pain and anger, and Wells was jostled out of the theatre.

The world was, however, ready to receive anæsthesia, and this failure with nitrous oxide heralded the first public demonstration of ether as an anæsthetic in the Massachusetts General Hospital on Friday, October 16, 1846. Though Wells returned to Hartford and used nitrous oxide successfully in his practice in 1845, the failure at Harvard resulted in the gas being neglected until June, 1863, when its use was revived at New Haven, Connecticut, again for dental surgery. This revival of interest was due to the perseverance of Gardner Q. Colton, who had first interested Horace Wells in the agent.

This time the dentist was Dr. J. H. Smith and success was just around the corner. Within 23 days they had already extracted 3929 teeth painlessly. They formed the Colton-Smith Dental Association in New York and within five years recorded 20,000 painless extractions. Colton visited Paris in 1867 and passed on the technique which came to England in the following year. Here the anæsthetist Clover and the dentist Coleman improved on Colton's method.

In 1868 Andrews of Chicago had added oxygen to the gas to prevent asphyxia, but it remained for Frederic Hewitt (1893), the first great teacher of anæsthetics, to improve the technique of administration in England in the 1890's.

Dr. Lothiesen, of Innsbruck, was the first to make a trial of ethyl chloride as a general anæsthetic. In 1901 Dr. W. J. McCardie, of

* Based on a paper given in a Symposium on Dental Anæsthesia to the Section of Anæsthetics, Manchester Medical Society, February 25, 1960.

Birmingham, published an account of his own cases which were the first attempted in this country (quoted by Gardner, 1916).

Ethylene, or "olefiant gas" as it was then known, was first prepared towards the end of the 18th century. It was not, however, used as an anaesthetic until 1923 (Luckhardt and Carter, 1923). Though giving better anaesthesia than nitrous oxide, the gas only enjoyed a limited vogue, and that mainly in America.

Divinyl ether was developed from ethylene and first used as an anaesthetic in 1933 (Gelfan and Bell, 1933). Since then, as "vinesthene", it has become a useful adjunct in dental anaesthesia.

Though cyclopropane was discovered in 1882 it was not used as an anaesthetic until 1930 (Stiles, Neff, Rovenstine, and Waters). From time to time its use has been advocated, but because of its inflammable nature and a high incidence of vomiting, this agent seemed an unlikely substitute for nitrous oxide. Recently, however, Bourne (1960) has described a technique by which the explosion hazard is eliminated.

The use of trichlorethylene as an anaesthetic agent was reported from the U.S.A. in 1935 (Striker, Goldblatt, Warm, and Jackson, 1935), but it was not introduced into England until 1941 (Hewer, 1942). Like "vinesthene", "trilene" has found a limited place as an adjuvant to nitrous oxide-oxygen in dental anaesthesia.

The intravenous administration of soluble barbiturates, which has done so much to rob general anaesthesia in hospital of its terror, was first practised in the late 1920's. Much of the early work on this group of drugs came from Germany, where sodium evipan was introduced in 1932 (Weese and Scharpf). This product has now been largely superseded by sodium thiopentone, introduced by Lundy in 1934 (Lundy, 1935). Despite the development of other thiobarbiturates, pentothal is still the most widely used agent of this group.

NITROUS OXIDE

From this historical introduction you will recognize that the one anaesthetic agent which was, in the words of a popular Yorkshire

advertisement, "First in the field and still going strong", is nitrous oxide. Of course, some newer agent may eventually prove to be as safe and as useful as nitrous oxide in the dental chair, but one of my objects this evening is to show you why this view cannot be held at present.

Despite the fact that nitrous oxide has enjoyed an unrivalled position in out-patient anaesthesia for almost 100 years, it has recently been subjected to close scrutiny. This has come about, not as a result of the introduction of some superior agent, but has followed a general concern over the occasional ill-effects seen.

In 1939 Courville published his book *The Untoward Effects of Nitrous Oxide Anaesthesia*. Looking back twenty years I think it will be agreed that this very useful book now serves as a warning against the misuse of nitrous oxide.

In England, Bourne (1925, 1960) has been foremost in condemning nitrous oxide as an unsuitable agent for out-patient work, but, owing to the lack of a universally acceptable alternative, his writings have apparently had little effect on its use.

Before we can see a clear picture of the position nitrous oxide should occupy to-day, we must probe into the background of these untoward effects, rare though they are. It has been widely taught that, given favourable circumstances, nitrous oxide is capable of inducing light surgical or third-stage anaesthesia. Now, if the surgical stage of anaesthesia means anything at all it signifies that level of depression at which a surgical operation can be carried out. I doubt if any surgeon would agree that this depth of anaesthesia has been produced by an inhalation agent unless the patient were relaxed and would remain so despite surgical stimulation. In this state the use of a gag or prop would be largely unnecessary. Indeed, there would be great difficulty in holding a slumping patient in the chair at all. This is not the picture seen when nitrous oxide is administered with an adequate amount of oxygen. If the proportion of nitrous oxide be now increased to approximately 90 per cent and the oxygen thereby reduced to

around 10 per cent, the patient, who may previously have been restless, is now immobilized, but he becomes cyanosed and rigid, not relaxed as he would be if anaesthesia were really being deepened to the third stage. The following simple illustration will serve to explain why the apparent improvement in operating conditions is more likely to result from oxygen deprivation than from deeper anaesthesia.

$$\begin{array}{rcl} \text{N}_2\text{O } 80 \text{ per cent} & \rightarrow & 90 \text{ per cent} = + 12.5 \text{ per cent} \\ & + & \\ \text{O}_2 & 20 \text{ per cent} & \rightarrow 10 \text{ per cent} = - 50 \text{ per cent} \end{array}$$

If, then, we are to administer nitrous oxide without any oxygen deprivation we shall recognize the fact that only second-stage anaesthesia is obtainable, and that the orthodox view that "this gas, by its anaesthetic action alone, is capable, under the most favourable circumstances, of carrying the anaesthesia only to slightly below the middle of the first plane of the third stage" is misleading. This discrepancy has, of course, been recognized before now. Palulel J. Flagg (1944) stated that "the great and real difficulty in gas and oxygen is the absence of true muscular relaxation". Frankis Evans (1949) declares that "nitrous oxide is an agent for the production of unconsciousness rather than one which can provide muscular relaxation". "The patient is in a condition of natural sleep."

The second stage of anaesthesia is only a "struggling stage" or "stage of delirium" where the patient's make-up and/or his surroundings make it so. The art of administering gas lies in preventing these influences from gaining the upper hand. That this can be done with some success in the absence of asphyxia is shown by a series of papers (Kloch, 1955; Tom, 1956; Mostert, 1958) published within the last five years and all advocating maintenance of anaesthesia with 15-20 per cent oxygen in the mixture. Tom, following Kloch's technique, assumes that with nitrous oxide the second stage of anaesthesia is synonymous with an excitement stage and postulates a state of analgesia between the first and second stages wherein surgical operations can be performed without pain or memory. To my mind this is

an unnecessary elaboration of theory, but it has allowed the two authors to justify the use of 15-18 per cent oxygen with nitrous oxide for dental anaesthesia, which even three years ago was an innovation in teaching. Mostert avoids oxygen deprivation by giving the patient 100 per cent oxygen only for 2 min. before induction with nitrous oxide. He maintains anaesthesia after the first half minute with a 20 per cent oxygen mixture. I am sure no one can dispute the validity of his claim to produce "nitrous oxide anaesthesia without harm".

It matters little whether anaesthesia is maintained with 15 per cent or 20 per cent oxygen so long as the patient is kept a good pink colour throughout. Teaching which fosters the belief that any form of surgical anaesthesia can be obtained with nitrous oxide-oxygen alone is likely to lead to a restriction in oxygen supply, at least to those patients who evidently have not reached this level. Such a teaching is, I believe, a part of the background to any charges which can be laid successfully against the use of gas and oxygen. I am convinced that if this agent be administered in such a way that no significant oxygen deprivation occurs, not only will it be adequate for many dental cases, but it will also be completely safe.

INTRAVENOUS AGENTS

If we are to administer nitrous oxide with a higher percentage of oxygen than has been usual in the past we shall need to consider the use of other supplementary agents. Any disturbance during an otherwise well-conducted nitrous oxide-oxygen anaesthetic, whether it be a ripple on the surface or a full-blown gale, usually results from the patient's dreams. Those dreams are likely to be the more vivid in an apprehensive patient, who may, however, respond very well if a suitable dose of barbiturate is given by mouth an hour or so before the anaesthetic is administered. If facilities are available for intravenous injection, barbiturates given by this route have a much more precise effect. It matters little whether we use thiopentone or one of the other ultra-short-acting agents so long as only small doses are employed. Doses of the order of 100-200 mg.

provide useful background sedation, and, just as with oral premedication, do not in any way replace the normal nitrous oxide-oxygen administration. Recovery is then almost as prompt as from nitrous oxide-oxygen alone and the patient is ready to leave the chair within 5 min. of ceasing the administration of the gas mixture. This prompt recovery is due to the fact that such a small dose, while it produces its effect on the brain within 20 sec. of being injected, is rapidly spread round the body and dispersed.

Larger doses of thiopentone may bring about a completely different state of affairs. It has been said that thiopentone is not an anaesthetic unless administered in overdose. This implies that if muscular relaxation and the abolition of response to stimulation are achieved by this agent alone, respiratory depression will be evident. Such a state of affairs may call for artificial respiration at any time, but when in addition some degree of respiratory obstruction is to be expected in a mouth containing blood, the hazards are magnified beyond all reason.

The object in using thiopentone is not to produce deep anaesthesia, but rather to modify the effects of nitrous oxide-oxygen administration so as to depress the higher centres controlling the patient's dreams without paralysing the muscles which make them manifest. It is therefore a technique to make possible the normal treatment of a difficult patient and not the completion of more extensive extractions in a normal patient.

There has recently been some lengthy correspondence in the dental press on the relative safety of intravenous anaesthesia for dental surgery, and Dr. Victor Goldman (1958) is to be congratulated on putting the fact so clearly before us. He analysed over $7\frac{1}{2}$ million anaesthetics in the dental surgery in the four years 1952-5, during which there were 56 deaths, in 20 of which an intravenous barbiturate was used. This gives an overall death-rate of 0.0073 per 1000, and corresponds with a figure of 0.0063 per 1000 obtained by Seldin in 1947 after analysing almost $2\frac{1}{2}$ million general anaesthetics administered in dental surgeries in the U.S.A.

However, when one considers the patients who were given intravenous anaesthetics the picture is very different. Estimating the use of barbiturates at 1 in 100 cases, the death-rate with 20 fatalities in $7\frac{1}{2}$ million anaesthetics analysed is 0.26 per 1000, leaving by inhalation methods alone a death-rate of 0.0047 per 1000.

More recent figures given by Goldman (1960) show the same trend, but because of the greater variety of anaesthetic agents recorded it is more difficult to compare the relative risks of inhalation and intravenous anaesthesia on their own.

The Registrar-General's Statistical Review of England and Wales for the Year 1952 told a similar story. In 1799 deaths under or connected with the administration of anaesthetics in the years 1950-2:-

2.7 per cent occurred where local anaesthesia alone was used;

2.7 per cent occurred where N_2O-O_2 alone was used;

11.5 per cent occurred where thiopentone was given alone.

Newer and shorter-acting barbiturates are now being tried out, and there is no reason to think that the same still holds for a skilfully administered intravenous hypnotic dose prior to the administration of gas and oxygen in the usual way.

OTHER ADJUVANTS

Thiopentone is not used unless decision to do so is made before commencing the anaesthetic, whereas other volatile supplementary agents can be added to the nitrous oxide-oxygen mixture if the patient's subsequent reactions call for some deepening of the anaesthesia.

Ethyl chloride has been used for many years as a supplement for nitrous oxide-oxygen anaesthesia. Its low boiling point allows it to be packed in such a way that it can be readily sprayed on to a mouth pack or added to the anaesthetic system. Chemically it is related to chloroform and shares some of the disadvantages of this drug. Unlike nitrous oxide, overdosage with ethyl chloride produces depression of respiration. Respiratory depression produced in this way is so quickly followed by circulatory depression that any slight

overdosage is potentially dangerous. This is in direct contrast to the effects of ether, for example, where respiratory depression is often deliberately induced. The dangers of ethyl chloride and chloroform to the heart are increased under conditions of inadequate oxygenation, a state which may exist, if only transiently, during dental anaesthesia. While ethyl chloride has never been regarded as a very safe agent, opinion has recently hardened against its routine use. As long ago as 1916 Bellamy Gardner described the agent as "more lethal than nitrous oxide", while McConnell (1959) recently gave it as his opinion that "the intrinsic disadvantages of the drug outweigh the advantages of convenience".

If ethyl chloride is to be used, and it is only suitable for fit patients, two golden rules must be observed. First, the agent must be used in small quantities only, and secondly, the patient must be breathing freely and be adequately supplied with oxygen.

Vinyl ether has never achieved widespread popularity and nowadays is hardly used outside the dental surgery. Massey Dawkins (1958) has recently drawn attention to its safety. He states that in the 10 years 1947-56 there were in England, Scotland, and Wales 69 deaths where ethyl chloride was the sole agent and one where vinyl ether was given. He also states that ethyl chloride was used six-and-a-half times as frequently as vinyl ether which suggests that the latter agent is ten times as safe as the former.

Vinesthene is usually administered in some form of closed or semi-closed system. It can be used by a single-dose method to replace nitrous oxide when the Goldman or Oxford apparatus is used. This method has been recommended mainly for children, but as it involves applying the face-piece to the child's face from the beginning, it is, I feel, a somewhat frightening procedure. The main use for vinesthene is therefore to supplement nitrous oxide-oxygen when it can be added to the gas stream from a 25-ml. bottle contained in a Goldman drip feed apparatus. Perhaps the most convenient method for many practitioners is to use 5-ml. ampoules in a modified Bradford trilene vaporizer.

Though more recently introduced, trichlorethylene is widely used as a supplement to nitrous oxide-oxygen anaesthesia. Except for its non-inflammable nature and its comparatively low cost there is little to commend its use in the dental surgery. As compared with ethyl chloride, overdosage is less likely to produce respiratory depression, but a recent survey undertaken by the Association of Anaesthetists (Edwards, Morton, Pask, and Wylie, 1956) has underlined the fact that primary cardiac failure can occur. The risk of this occurring in a tranquil well-oxygenated patient is small, but increases in the presence of oxygen lack, especially if accompanied by struggling on the part of the patient.

As suitable alternative techniques are available it is probably wiser to avoid the use of trichlorethylene in the dental chair.

Introduced in 1956, halothane is, at present, the only other volatile non-inflammable agent suitable for use as an adjunct to nitrous oxide-oxygen anaesthesia. Though Goldman (1959, 1960) has recently reported favourably on its use it is still too early to assess the final place which this agent will occupy, but it would appear at present as a supplementary agent of great promise to be used by experienced administrators.

Cyclopropane has been advocated as a substitute for nitrous oxide in dental anaesthesia on more than one occasion in the last 20 years, but has shown no signs of being acceptable. Three major features of its action suggest that it will never replace gas for use in the dental chair. It is a powerful, non-irritant agent, which will give deep anaesthesia very readily—with all the accompanying risks in the sitting position. Secondly, it is inflammable and explosive in a mixture containing more than 25 per cent oxygen, and it has been shown (Bourne and Morton, 1955) that ignition can be caused by sparks thrown off when forceps fracture the enamel of a tooth. Lastly, cyclopropane results in a high incidence of nausea and vomiting after the extractions are completed.

Bourne's technique (Bourne, 1960) shows promise of overcoming the first and second

of these disadvantages, and results of further trials of his method are awaited.

I have suggested earlier that for the apprehensive patient anaesthesia should be commenced by the intravenous administration of a small dose of thiopentone rather than after a sedative given by mouth. The recent wide-scale development of mild sedatives and tranquillizers has so far not found widespread application in dental practice. Under conditions of emotional stress the rate of emptying of the stomach is likely to be prolonged, and hence any drug given orally, especially if it is contained within a capsule or enteric coating, is unpredictable in its effect. The sedative effect will be the most constant in those placid persons who least need such preparation. Furthermore in my opinion oral sedatives taken beforehand preclude the use of intravenous thiopentone in the surgery. Owing to the above-mentioned factors it is often difficult to judge whether the oral drug has produced its maximum effect. If an intravenous injection be given before this occurs the two may summate and result in a delayed recovery after anaesthesia. I have found that the most nervous patients will always co-operate without any oral sedation provided they realize that they are to receive the help of an intravenous induction. It has been shown (Goulding, Helliwell, Kerr, and Wilkin, 1957) that in children the use of pre-anaesthetic sedatives by mouth, in doses suitable for out-patient use, produced no effect on behaviour. With or without premedication there was a marked difference in behaviour between the small children and those over 6 years of age who had developed more independence and self-control.

With adults, as with children, the exercise of tact and consideration will enable a bond of trust to spring up which will be far more useful and long lasting than any chemically induced tranquillity.

FUTURE TRENDS

So far I have discussed the past and the present—but what of the future? With the great development of the pharmaceutical industry during the last 10 years, it is very probable that many new anaesthetic agents

will be introduced. And as they are introduced so they will be subjected to clinical trials, including their suitability for dental anaesthesia. It may seem rather a rash prediction, but I feel quite certain that perfection in out-patient anaesthesia will not come in this way. I believe that with modern drugs and apparatus we can achieve as good results to-day as the conditions under which we must work permit. If nitrous oxide fails to furnish adequate operating conditions it is because it is incapable of providing deep anaesthesia. It is only when the stage of surgical anaesthesia is reached or muscle relaxants are employed, that the patient is largely unprotected against the ill effects of respiratory depression and the entry of foreign material into the lungs. To provide perfect operating conditions by either of these two methods while retaining the usual upright position, with no further safeguarding of the airway than that provided by a mouth pack, is to court disaster. Perfect operating conditions can be provided with general anaesthesia, but only under operating-theatre conditions where every provision for the patient's well-being is present. Such conditions do not exist in the average surgery, however well equipped, and certainly not in the patient's bedroom at home. Few of our patients can afford to spend even one night in a nursing home, but it is to be hoped that, with the increasing dental consultative facilities within the hospital service, more of the multiple extractions, together with other oral surgical procedures, may be carried out under the best possible conditions for all concerned.

I believe that the increasing complexity of modern medical treatment brings not only benefits but responsibilities as well. It demands the attention of a number of experienced anaesthetists greater than has been engaged in this branch of practice heretofore. These anaesthetists will be called upon, not merely to give the anaesthetic but also to provide an advisory and a supervisory service in the pre- and post-operative periods. They will have to advise on conditions of fitness for anaesthesia such as, for example, are posed by the increasing use of steroid therapy for rheumatoid arthritis and other conditions.

Only in this way, by supplementing the very large number of skilfully administered anaesthetics which you give, can we hope to provide an overall service satisfactory to patient and dentist alike.

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Bacteriæmia after Prophylaxis

Transient bacteriæmias were demonstrated to occur during certain parodontal procedures. Although such bacteriæmias were of short duration and of no clinical significance in the healthy patient, they could be dangerous to patients with a background of valvular or rheumatic heart disease.

The investigation was undertaken to determine whether bacteriæmias occurred at all from parodontal procedures and if they did, whether they were affected by the degree of parodontal disease.

The parodontal conditions were graded into: (1) Gingivitis; (2) Mild periodontitis; and (3) Periodontitis, with one of the following—mobility greater than 2 mm., pockets of 3 mm. or more, exposure of bifurcation.

Blood-cultures were taken from each patient before and after prophylaxis procedures. The procedures performed were calculus removal and curettage of crevicular epithelium. Seventy-two patients were investigated in all.

Results.—Of the cultures taken before prophylaxis none was positive in the group of 21 gingivitis cases, 2 were positive from 32 Grade 1 periodontitis cases, and 3 were

positive out of 19 Grade 2 periodontitis cases.

After prophylaxis all groups showed some positive cultures which statistically were highly significant for the periodontitis groups. Those found in patients with gingivitis were not considered significant. The organisms most frequently found were *Staphylococcus aureus* and *Streptococcus viridans*.

It is suggested that where prophylaxis is to be undertaken a history should be obtained with regard to possible heart disease. Where this exists, aseptic precautions should be taken and antibiotic therapy considered.—WINSLOW, MAX B., and KOBERNICK, SIDNEY D. (1960), *J. Amer. dent. Ass.*, **61**, 69.

J. R. GRUNDY

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THE PRACTICE OF PERIODONTOLOGY*

I. PERIODONTOLOGY IN GENERAL PRACTICE

By JOHN S. ZAMET, F.D.S. R.C.S. (Eng.)

THE picture of periodontology in general practice is one of unrelieved gloom. Too many patients are walking about suffering from untreated or partially treated periodontal disease, though in many cases they are classified as dentally fit. The cliché "systemic cause" is applied liberally, but many of the chronic cases are due to factors of local origin, the elimination of which is well within the scope of the practitioner. Periodontics is under the shadow of a "Cinderella complex"; its practice is time-consuming, and good results are not always easily attained. In far too many cases ignorance of the subject is drowned in a stream of chromic acid. Even more dangerous is the often painless nature of the disease, and the possibility that it may not appear obvious except in its later stages, so being easily ignored.

UNDERGRADUATE TEACHING

Undergraduate teaching is inadequate; it is still to be deprecated that some teaching hospitals have no Department of Periodontology. Too much emphasis is based on techniques and not enough on the basic principles. Surely the correct way to teach students periodontal treatment is by full mouth diagnosis, prognosis, and treatment planning rather than the carrying out of isolated operative procedures on a succession of patients. Thus a student should carry through a case from start to finish, realizing in so doing the importance of pre-planning. The artificial barriers set up in the student's mind, by the teaching of different aspects of dentistry separately, could be broken down. The interdependence of conservation, prosthetics, orthodontics, surgical and periodontal treatment would at the same time become more obvious. It is muddled thinking which leads many

practitioners to view patients primarily from the standpoint of the number of fillings required. Then, when these are completed, the problem is viewed in wider perspective, only to find it necessary to double back and re-assess the mouth from a periodontal or prosthetic point of view.

Too big a gap exists between the full-time university teacher and the general practitioner. Practical periodontal treatment can only be taught by someone aware of the necessities of general practice. Hence it seems absurd that university teachers may not practise on a part-time basis. In America and the Scandinavian countries even the most academically applied minds pursue practice, and progress has hardly been retrograde. This is not a plea for general practitioners to take over the teaching of students, but for the allowance of some degree of extra-mural practice.

The use of general practitioners for teaching students is in many cases an abject failure, a case of the blind leading the blind. Too many of these practitioners use their sessions as a rest from the humdrum of general practice, and have not acquired the knowledge to teach; they rely all too often on what remains from past undergraduate study.

THE NATIONAL HEALTH SERVICE

The National Health Service regulations concerning periodontal treatment are unrealistic and the fees inadequate. However, the solution is not to be found either in altering the schedules or raising the scale of fees; this would encourage abuse.

No positive moves have been initiated and carried through since the Scheme started in 1948 with respect to periodontal treatment, and there has been little demand for a change. According to the present figures the average practitioner carries out only three of the so-called prolonged gum treatments per year, and one gingivectomy in 18 months.

* Presented to the British Society of Periodontology on Nov. 14, 1960, as a Symposium on "The Practice of Periodontology".

Positive action is needed in three directions:

1. Correct teaching at undergraduate level, as discussed above.

2. A year's minimum internship in a hospital or clinic to be compulsory after qualifying. Thus experience would be obtained without the lure of excessive remuneration achieved at a sacrifice of standards.

3. The placing of more emphasis on post-graduate courses, these being especially aimed at the less recently qualified practitioners who have never had the advantage of periodontal training.

In the N.H.S. schedule periodontal treatment should be listed under a separate section and not included under conservative treatment. The invidious term "prolonged gum treatment" should be deleted. Instead, treatment could be listed and read as:—

1. *Diagnosis.*

2. *Treatment of Acute Inflammatory Disturbances:—*

Vincent's infection;

Acute herpetic gingivostomatitis;

Periodontal abscess.

3. *Treatment of Chronic Inflammatory Disturbances (and removing pockets):—*

a. Scaling and polishing teeth, including oral hygiene instruction;

b. Subgingival curettage;

c. Gingivectomy.

4. *Recontouring of Gingival Tissues (gingivoplasty).*

5. *Occlusal Reshaping by Selective Grinding.*

THE FUTURE

If the gloom is to be lifted then the problems of education must be faced. However, further than this a fruitful imagination is not needed to see a future with the establishment of National Health Clinics where specialists in periodontics could advise and operate.

The basic staffing of such establishments will come from the newly qualified, in their year of internship, and also from the ranks of the dental ancillaries.

It may not be presumptuous to imagine that in the future the basic practice of dentistry will be carried out by technicians and ancillaries, and that the dental surgeon will occupy the role of an oral physician. It is probable that under these circumstances we could then come to grips with the huge problem of periodontal treatment.

CONCLUSION

The picture of periodontal practice in this country is presented as one of almost total darkness. Some suggestions have been made with the hope of improving this position.

II. THE PRACTICE OF PERIODONTOLOGY IN THE ROYAL AIR FORCE

By Wg. Cdr. G. W. CLOUTMAN, F.D.S. R.C.S., R.A.F.

INTRODUCTION

THIS paper is an attempt to sketch a general picture of the work of the periodontist in the setting of one of the armed services. Fully representative facts and figures concerning the incidence of periodontal diseases in the Royal Air Force would be most helpful, but, as will presently become apparent, the writer's sample would be statistically unreliable, and so is better left alone for the present.

THE APPOINTMENT

The appointment in this speciality in the Royal Air Force Dental Branch was put into effect on a provisional or "acting" basis at about

the same time as the formation of this Society. The appointment was designated "specialist in periodontology and preventive dentistry", and with it was, and still is, combined the function of selecting and training dental hygienists.

Thus preventive dentistry, periodontology, and a continuous training programme form a triad of activities which seem to dovetail reasonably and logically. It will of, course, be appreciated that a considerable limitation on the volume of clinical work is inevitable.

NEWLY COMMISSIONED OFFICERS

The location of the dental hygienist training school and the periodontal clinic at the Royal

Air Force Dental Training Establishment created an opportunity for some contact between the periodontist and new dental officers at the time of their entering the Service. Over several years this has been utilized to a varying extent. When they join the Service, officers—serving hitherto on National Service, Short Service, or Permanent commissions—come to the Dental Training Establishment for an introductory course. It is difficult to know to what extent one should explore, and if necessary try to provoke concern for the periodontal aspect of dentistry at this stage. Faced with groups such as these, it always seems untimely to be dogmatic because the Dental Officers come from different schools and this might well create a lot of confusion. One must always bear in mind that the Royal Air Force approach is on the basis of full clinical freedom.

In a really appreciable proportion we do see apathy, to put it at the mildest, and one is tempted to a more "pragmatic" approach in these circumstances.

SPECIALIST'S FUNCTION

At least, on this introductory course, the position of the periodontal specialist can be clarified.

It is not intended that dental officers should be in any way deprived of any aspect of their balanced practice by channelling cases of peculiar interest or difficulty to specialists, but that they should use us as a second opinion—someone who may bring a different approach in some matter of difficulty—a service for those who may, in the earlier stages of their professional careers, be a little harassed by the quantity of their clinical commitment. There is no mystery or special status involved in the practice of this speciality.

Essentially, then, one's practice involves a systematic diagnostic procedure and a step-by-step elimination of aetiological factors—where these factors are tangible or accessible to treatment. As a specialist in physical medicine put it, one needs "time to brood a little over some cases". The specialist facility is mainly useful for the reference of intractable cases, i.e., those which have undergone treatment but which seem to progress so far and no further.

ADMINISTRATION OF THE SPECIALITY

From what has been said, it will be clear that, in fact, one specialist cannot provide comprehensively for the whole of the Royal Air Force. Even within the United Kingdom, distances can be too great for more than one visit, and periodontal treatment more often than not involves a series of sessions at intervals so planned as to allow time for the effect of treatment to become apparent—and to bring in the factor of the patient's active participation in the improvement of his condition. Very rarely, then, does a condition present where the work can be decisively concluded within the space of a few days, and even more rarely do these cases justify admission to hospital. Therefore one's activity is sometimes limited to no more than suggesting a treatment plan to be carried out at the patient's own station. In the light of some experience in the dental departments of hospitals, with patients referred for the most part for oral surgery, I find this a rather unsatisfactory element in the administration of the speciality.

CLASSIFICATION OF CASES

A rough classification of the types of cases referred may help the reader to picture what is dealt with. The patients seen during the past 2-3 years can be classified into four main groups.

1. A small quota of recurrent aphthous stomatitis, herpetic stomatitis, denture irritations, and so on, amounting to about 5 per cent.

2. A rather larger quota of acute gingivitis, mostly ulcerative in type. These contribute perhaps 10-15 per cent of cases referred, and whereas some are initial experiences, the majority are recurrences carrying a record of assorted treatment methods in the past. They will be discussed later in this paper.

3, 4. The third and fourth classes comprise the majority of cases. They are fairly evenly divided between persistent chronic gingivitis in men and women up to the middle and late twenties, and then more or less advanced chronic destructive periodontal disease cases from higher age-groups. In the former, there is a considerable proportion who have superficially clean mouths but are in fact not cleaning

effectively: there is, especially interdentally, a creamy, usually quite inoffensive trace of food and desquamation residue, and the patient is quite unconscious of it and has never been instructed as to how to deal with it. In such cases, the suggestion of gingivectomy appears on the patient's documents as though it were a standard procedure for a gingivitis in which the cause is not very clear and where the sulci are somewhat deepened and bleed on blunt exploration. So often one finds that there is a tangible cause and that if the patient will co-operate its removal is possible—and maintenance is possible.

TREATMENT POLICY

Management of these cases, in other words the policy followed in treatment, is bound, in the writer's opinion, to be linked with the programme of training of hygienists and their immediate availability to give time and meticulous care in oral hygiene treatment.

We find ourselves always choosing the conservative approach, that is, when profound pocketing or considerable hyperplasia of the soft tissues do not dictate otherwise. By this is meant thorough and sometimes frequently repeated supra-, sub-gingival and interdental cleansing which aims at the elimination of the altered environment and the creation of a tooth-gum relationship which can be kept clean. This description is somewhat oversimplified, but it will be appreciated that, in individual cases, the requirement also obviously arises for elimination of occlusal trauma, packing, curettage, and so on. In order to give the picture proportion, however, the part played by the hygienist must be given most emphasis.

DENTAL EDUCATION BY ANCILLARIES

Here, then, is the justification for someone especially concerned with periodontology being responsible for training these ancillaries. Their function is two-fold—operative and educational. It is in the latter role that attempts are made to give them the information about the basic pathology of gingival and periodontal conditions, and then, if it is possible, to infuse the zeal to persevere in persuading

patients to play their part in the treatment and for ever thereafter in the maintenance of the conditions attained. Last month our President in his address referred to different grades of patient ranging from the eager and co-operative to the indifferent and the lost causes. Judging from what has been overheard in our clinic, it appears that the really zealous hygienist will have a crack at anything. We have not, for the most part, observed much benefit from either dental officers or hygienists lecturing or showing films to groups: this is still done at training stations, probably with a little good effect. It is at the chairside and to the individual that the instruction penetrates—the appeal to pride in appearance in the young, the matter of protection of health in the older, the encouragement of the pessimistic, a little nagging for the negligent, some coaxing for the apathetic, and gentle but purposeful bullying for the downright dirty. To the individual they can pin-point a difficulty of crowded teeth for example, and say, "This is *your* problem and this is what *you* can do about it". This kind of instruction is given whether or not disease is clinically apparent. It is essential if we are to follow up our gingivitis/periodontal disease cases successfully. We all know the frustration of cases dealt with operatively and then not effectively maintained at home: and in Britain, whatever may be the frequency of repetition in this Society, only a handful of people know of, and know how to use, adequate home oral hygiene methods.

ACUTE ULCERATIVE GINGIVITIS

Acute ulcerative gingivitis has already been mentioned in this paper and has a certain "service notoriety"; a notoriety based presumably on its recorded incidence in severe form, and its effects in both wars. The following are expressions of personal opinion based on personal experience.

In the peace-time service with better living conditions, better feeding, closer medical supervision of young people, an improvement in dental cover, and removal of the intense stress of short training courses, sometimes unpredictable operational activity, and so on, the incidence of ulcerative gingivitis is very small

and the form the disease takes is mild and usually only local in effect. Occurrences of 15 and 20 years ago, which were reported as epidemics, do not appear.

With this condition the first essential is, if possible, to recognize an area of stagnation or incubation for the infection, and then when the inflammatory and ulcerative states have abated under treatment, to eliminate that zone as early as possible. In the writer's opinion, there is no really useful specific medication for acute ulcerative gingivitis, although a single application of a caustic followed by an effective antidote or neutralizing agent does appear to diminish local discomfort. Often patients' documents describe persistent repetition of some preparations which can only produce in time a further chemical irritation superimposed on the infection. Since irrigations are necessary for removal of necrotic debris, a bland oxidizing antiseptic can of course be of some assistance. Resort to antibiotics, either orally or parenterally, is to be avoided except where the infection is severe, and where there are general symptoms, and it is a matter of relieving distress as quickly as possible.

III. DENTAL AUXILIARIES

By J. V. BINGAY, M.B.E., L.D.S.

Director, School for Dental Auxiliaries, London, S.E.14

THE value of dental auxiliaries is a subject of much controversy and there are some members of the dental profession who are opposed to their use. It must, however, be appreciated that the present training scheme is an experiment which the Government has required the General Dental Council to carry out. Judgement, either favourable or condemnatory, should thus be withheld until adequate evidence is available.

The School for Dental Auxiliaries has been opened in New Cross Hospital, London, in accordance with the provisions of the 1957 Dentists' Act, to carry out an experimental scheme for the training and employment of ancillary dental workers who will be permitted to fill teeth and extract deciduous teeth in the dental services of hospitals and local authorities. The object of the experiment

is to discover the value of these dental auxiliaries to the community, and it is expected to be four or five years before sufficient information has been acquired for the results to be judged. The General Dental Council propose that, during the experiment, young women should be trained to treat school children and pre-school children in the local authority health and school dental services.

THE TRAINING SCHOOL

The School is sited in a former isolation block in New Cross General Hospital. The ground floor contains a clinic with 31 individual surgeries and, on the first floor, there is teaching accommodation for 120 students and administrative offices. The teaching staff consists of the Director and 3 other dental surgeons assisted by 3 tutors trained in New

DOCUMENTATION

Several references have been made to the revelations of documents used in the Royal Air Force for purposes of recording treatment, communicating opinion, and so on. At present, however, there are major limitations in our ability to record the oral hygiene and periodontal condition at a recruit's initial dental inspection. Some pictorial, diagrammatic, or written account, or a generally accepted set of abbreviations or symbols is lacking. But with all respect to those who have already suggested methods, there still seems to be a need for a speedy concise system which 90 per cent or more practitioners would be willing to operate and which their chairside attendants could readily learn. When seeing a patient for the first time one often thinks, "I don't know how long this has been going on." Nothing is known about the rapidity or otherwise of a deteriorating state: one looks back into a void as far as information is concerned, and the starting point is set by the often vague account of the patient backed by one's own fairly experienced guesswork.

Zealand under the school dental nurses scheme. Some increase in the dental staff will be necessary when the School reaches its capacity of 120 students at the beginning of the second year.

The General Dental Council have decided that student auxiliaries should be not less than 17 years of age and should normally have obtained the General Certificate of Education or an equivalent certificate showing a satisfactory standard of education. Students have been selected from all parts of the United Kingdom and from different age-groups; from various types of districts, and with a variety of educational and other qualifications. An overwhelming number of applications was received for the first 60 places and the candidates who were finally selected started their studies in October, 1960.

Patients will be drawn mainly from London County Council Schools in the New Cross area and, in addition, mothers with children of pre-school age will be encouraged to bring them to the clinic for treatment.

CURRICULUM

The course extends over two years and is devised to meet the requirements of the Act and the conditions imposed by the General

Dental Council. During their first year, students will spend some 400 hours on lectures and demonstrations and about 800 hours in tooth carving, practical instruction on the phantom head, etc. If, at the end of the first year the student has reached a satisfactory standard of skill, she will then proceed to clinical work on patients, under the strict supervision of the staff dental surgeon, and always subject to the limitations imposed on the scope of her work. During her second year the student will spend about 450 hours on lectures, practical demonstrations, and tutorials, and will devote about 650 hours to clinical practice.

A particular interest attaches to the first team who started work last October, for it is upon their achievement, after they have been in practice in the local authority dental service for a year, that the first conclusions concerning the value of dental auxiliaries will be based. They can rest assured that the General Dental Council, the Privy Council, and indeed the whole dental profession, Parliament, and the public will watch their progress with the deepest interest. If they succeed, they will be the advance guard of a new force deployed against the inroads of a disease which is one of the greatest remaining menaces to health and comfort in civilized life.

Perforation of the Middle Third of the Face

A 47-year-old man was admitted after a car accident. The gear lever had entered the left side of his face close to the lips, passing through the maxillary sinus, palate, the oral cavity, and on through the opposite pillar of the fauces. After passing medial to the neck of the right condyle, the tip had protruded through the skin below the right mastoid. The lever had broken off and was still transfixing the patient. Other injuries were lacerations of the scalp and a fractured tibia.

Blood was cross-matched in case major vessels were involved, two intravenous infusions were started, and the patient anaesthetized through a tracheostomy tube, introduced under local anaesthesia.

The knob of the gear lever was unscrewed and the shaft gently withdrawn. No bleeding occurred. Tooth and bone fragments were removed, the antral defect repaired with a cheek flap, and both soft-tissue wounds closed in layers, a drain being inserted into the exit wound. A long leg cast was applied to the tibial fracture.

The drain and skin sutures were removed on the third and the mucosal sutures on the fifth post-operative day. His right eye was initially taped shut because of facial nerve weakness, but function rapidly returned and was almost normal three months later. Remarkably little deformity resulted from this severe injury, the only permanent loss being three teeth.—STEWART, F. W. (1960), *J. oral Surg.*, 18, 512.

G. R. SEWARD

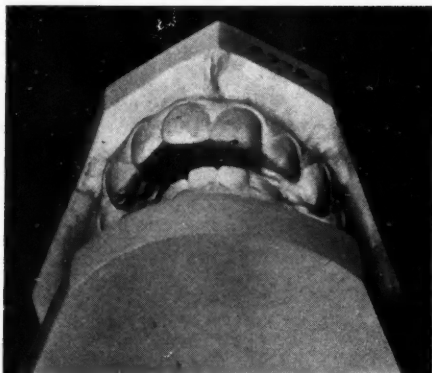
LETTERS TO THE EDITOR

March 15, 1961

Dear Sir,

In the November, 1960, issue of THE DENTAL PRACTITIONER there appeared an article entitled "Habit Without Harm". This article describes a case presented by Mr. D. Logie on March 13, 1959, before the Odontochirurgical Society of Scotland. This case was purportedly that of a 4½-year-old boy who has sucked his thumb since birth. Mr. Logie claimed that there was no evidence of malocclusion and showed some photographs and a cephalometric X-ray to prove his point.

I am sorry, but I most strongly disagree with Mr. Logie's conclusions. If you examine the photograph of the boy sucking, you will notice that not only is the thumb in his mouth, but the fingers of his hand are clenched in a fist and he is pushing his hand against his teeth. If he merely sucked his thumb and pulled it outward, exerting pressure against the palate and lingual surfaces of the incisors we would find the typical maxillary protrusion of the thumb-sucker. However, since he is pushing against the labial surface of the incisors, we find a change in the axial inclination of these teeth in a lingual direction. He is actually taking a firm grip on his premaxilla and exerting a lingual rotating force on it. An examination of the intra-oral photograph shows normal spacing of the mandibular incisors for a child of this age, but a lack of spacing among the maxillary incisors. There is a deep bite present, and the maxillary incisors appear to be in lingual-axial inclination.



Case 1.

I enlarged the photograph of the cephalometric X-ray and measured the angle formed by the intersection of a line passing through the body of the maxillary central incisors and a line connecting the sella turcica with the nasion. The accepted value for this SNI measurement is 103 degrees. This boy's SNI angle is 77 degrees. Even allowing for any errors in using the photograph rather than the actual X-ray, I feel it an indisputable fact that these maxillary incisors are tipped lingually, the direct result of the child's thumb-sucking habit.

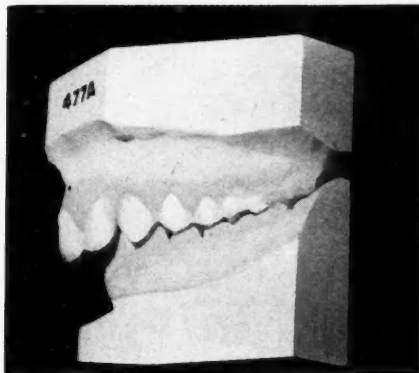
I was not as much perturbed by Mr. Logie's incorrect diagnosis of this case as I was by the fact that you

published this case under a heading "Habit Without Harm". Dentists reading this article in a journal of great repute, such as yours, might erroneously come to the conclusion that thumb-sucking does not produce dental deformities, and advise their patients accordingly.

Thumb-sucking does produce malocclusions. Some of the malocclusions are slight, some are quite severe. I am



Case 1.



Case 1.

enclosing some photographs of the malocclusions that are the direct results of thumb-sucking.

Photographs of the first case show a Class II, division 1 malocclusion with a severe deformity of the maxillary arch. There is greater deformity on the right side than on the left, due to the fact that the child kept her thumb on this side. She pulled her thumb in an outward direction and thus deformed her arch.

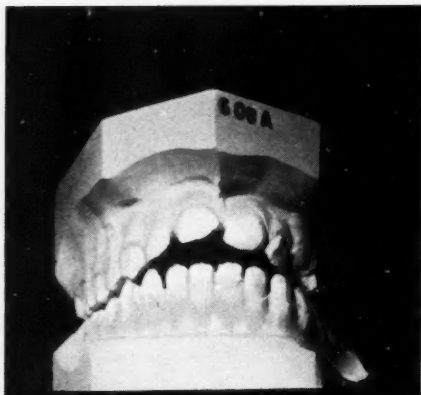
The second case is that of a girl with a normal relation of her posterior teeth, but as an open bite anteriorly. Both the maxillary and mandibular teeth are spaced and flared labially, and the maxillary incisors have failed to

fully erupt, even though the girl is now 15 years old. Here the child held her thumb in the middle of her mouth and pulled forward on it as she bit down.

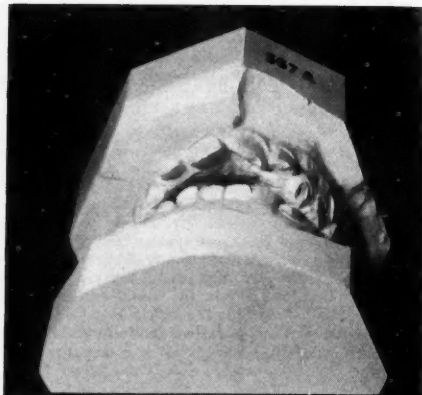
The third case is that of a Class II, division 1 open bite in the mixed dentition stage. Here the thumb was kept in the centre of the jaws and pressure was exerted upon the palate and the lingual surface of the maxillary

flare but moved forward in one segment and spaces opened up distal to the lateral incisors.

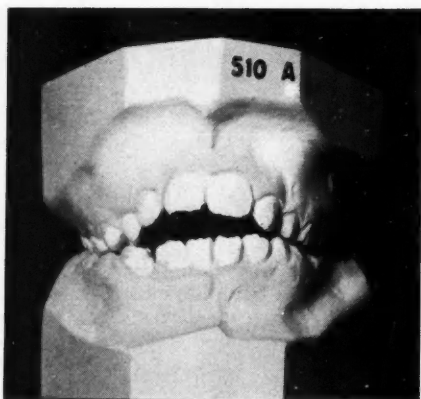
Any pressure exerted upon the teeth in an abnormal (non-functional) direction will produce movement. By analysing the malocclusions we can easily reconstruct the direction of the abnormal forces and correlate it to the type of finger- and thumb-sucking that has taken



Case 2.



Case 3.



Case 4.

incisors. No pressure was exerted on the mandibular incisors and they are in normal positions. The maxillary incisors are inclined labially with large spacings between them. Here we have a maxillary alveolar protrusion due to thumb-sucking.

The last case is that of a Class I open bite in the mixed dentition stage of development. This child kept her thumb on the right side biting down on it and pulling it forward. Both maxillary and mandibular teeth are depressed, more on the right side than on the left, and the maxillary alveolar segment has moved forward. Since the child kept her first finger curled around the labial surfaces of the anterior teeth and lip, the teeth did not

place. While thumb-sucking does produce deformities, it is generally felt that if the child discontinues the habit by the age of 5 or 6, Nature can correct most of these malocclusions. However, if the habit continues past this age, permanent deformities result, requiring orthodontic correction.

Respectfully yours,

ERWIN C. LUBIT, A.B., D.D.S.

Brookhaven Medical Arts Building,
Schoenfeld Boulevard,
Patchogue, New York

An Instrument for Measuring Lengths of Root Canals

March 13, 1961

Sir,

Messrs. Allred, Grundy, and Hatt have misunderstood the use of the instrument. All it does is to measure the length after reaming and sterilization and so avoid the necessity of that conventional equation:—

$$\frac{\text{length of root on X-ray}}{\text{length of diagnostic wire on X-ray}} = \frac{\text{length of diagnostic wire}}{\text{length of canal}}$$

Of course, knowing the length of the canal is important for preliminary reaming, but this can be taken from the diagnostic X-ray that shows the necessity of root treatment in the first place. I am sure Messrs. Allred, Grundy, and Hatt do not start with putting a diagnostic wire in the canal immediately on opening the cingulum.

Yours etc.,

EDGAR GORDON

1 Hillside Court,
Hendon, N.W.4.

BOOK REVIEWS

MINOR TOOTH MOVEMENT IN GENERAL PRACTICE. By LEONARD HIRSCHFELD, B.A., D.D.S., Associate Clinical Professor of Dentistry, Section of Periodontology, School of Dental and Oral Surgery, Columbia University, New York. 10×7 in. Pp. 332, with 293 illustrations. 1960. St. Louis: The C. V. Mosby Company (London: Henry Kimpton). 90s.

To the present rich store of text-books on the treatment of malocclusions has now been added another, this time by a periodontologist. This may seem unusual, but, as the author explains, the book does not deal with simple orthodontics, but rather with the correction of small local irregularities and malocclusions. As would be expected the cases described are largely adult, and their treatment is discussed from the viewpoint of a periodontologist. It is most encouraging to find signs of a breach in the barrier that tends to separate orthodontics from other branches of dentistry.

The book is well presented, being logically set out and profusely illustrated with photographs and drawings of very high quality. Many years have obviously been spent in preparation for this book; photographs of a number of cases which depict progress over a decade after tooth movement are of considerable interest to the orthodontist.

After an introductory chapter dealing with methods of treatment, the author describes in some detail case examination and analysis. The third chapter is largely an account of local mechanical causes of malocclusions. The selection of cases for minor tooth movement is discussed at some length. Prerequisites necessary to perform tooth movement are such as apply to all orthodontic treatment, but include the added limitation imposed by necessity to refer all "real orthodontic cases" to an orthodontist. A brief chapter on the response of the supporting tissues during tooth movement is interposed before chapters on the mechanical principles of appliances and anchorage. After discussing the laboratory techniques that may

be required and the management of appliances, the remainder of the book describes in detail methods of accomplishing movement in various directions.

While it is inevitable that there should be differences of approach to treatment, there is one aspect which should receive some comment. It is difficult to accept the author's partiality for pericoronal ligatures and elastics instead of the more conventional removable appliances, especially since the author admits the superiority of anchorage and force control obtainable with the latter.

This book will be a valuable addition to the libraries of teaching schools and those concerned particularly with the treatment of malocclusion and its sequelae. Its cost, however, will exclude it from regular use by students. It has the unique merit of giving an account of tooth movement in adult patients, based on many years' experience.

B. C. L.

ESSENTIALS OF MEDICINE FOR DENTAL STUDENTS. By A. C. KENNEDY, M.D., M.R.C.P.E., F.R.F.P.S., Lecturer in Medicine, University Department of Medicine, Royal Infirmary, Glasgow. 8½×5½ in. Pp. 272+viii, with 38 text illustrations and 27 plates. 1960. Edinburgh and London: E. & S. Livingstone Ltd. 25s.

As the author states in his introduction he has set out to produce a book on the medicine a dental student should know, and in my opinion he is to be congratulated on the manner in which this has been achieved.

The text is well written and readable, and the simple and straightforward illustrations most lucidly express what is intended.

Here is a clear exposition of simplified medical principles which should present no difficulties to the dental student. Only a senior and experienced clinician could have so simplified the presentation of his subject without "talking down" to the student. This

is a refreshing replacement of an attitude so frequently deplored in the past. There is no question that the dental student should be taught the basic principles of medicine. It is equally admitted that he should not become a consultant physician. This book steers a middle-of-the-road course, dealing with the fundamental pathology of most medical diseases without unnecessary detail, and at the same time dealing faithfully and in greater measure with those conditions which have a bearing on the dental surgeon's work, or which, by virtue of their oral manifestations, may come to his notice first. An asset to every dental student's book-shelf.

G. L. R.

ENDODONTIC PRACTICE. By LOUIS I. GROSSMAN, D.D.S., Dr.med.dent., F.A.C.D., Professor of Oral Medicine, School of Dentistry, University of Pennsylvania. Fifth edition. $9\frac{1}{4} \times 6$ in. Pp. 402, with 327 illustrations as 143 figures, 1 in colour. 1960. London: Henry Kimpton. 56s.

The previous edition of this well-known book was entitled *Root Canal Therapy* and appeared in 1955. Although the length of the text is virtually unaltered, this new edition has undergone a number of changes, the most obvious of which are the omission of the chapter dealing with focal infection and the expansion of the section on antibiotics.

The initial chapters deal with the diseases of the pulp and periapex and their diagnosis. The different methods of treatment of teeth with diseased vital pulps are fully described. The rationale of treatment is then given, followed by an account of case selection and the principles of treatment. After considering the anatomy of the pulp chamber and root canals, the individual stages of treatment are discussed. Besides dealing with the manner of cleansing the canal, detailed descriptions are given of the methods by which the latter may be sterilized and filled. Separate chapters are devoted to the bacteriological control of treatment and the surgical aspects of root treatment. The treatment of fractured teeth and the bleaching of discoloured teeth are also described.

This book maintains the high standard set by previous editions and can be recommended wholeheartedly to both undergraduate students and practitioners.

E. N.

TEXTBOOK FOR DENTAL NURSES. By H. LEVISON, B.D.S. (U.Lond.), F.D.S. R.C.S. (Eng.), Principal School Dental Officer, County of Anglesey. $8\frac{1}{2} \times 5\frac{1}{2}$ in. Pp. 140+xii, with 40 illustrations. 1960. Oxford: Blackwell Scientific Publications Ltd. 18s.6d. Paper covers.

THIS is a small paper-backed book of 140 pages written in a clear and simple style, and can easily be read in an evening. It is a welcome addition to the small collection of text-books written for dental nurses in England—its American counterparts being far too detailed.

Because of its simplicity it is an ideal text-book for last-minute revision, each chapter concluding with a summary for easy reference.

For dental nurses taking a recognized course this is a useful book to be used in conjunction with lecture notes, practical demonstrations, and more detailed text-books on anatomy and physiology.

The line drawings are good and simple to understand, whereas the photographs of instruments are unnecessarily large and a waste of valuable space. Several important items in a dental nurse's training have been omitted, such as surgery management, ethics and decorum, care and maintenance of instruments and equipment.

On summing up, this is a book which every dental nurse should possess, as its contents are invaluable for everyday reference and for those taking examinations.

J. M. L.

BACK NUMBERS

The Publishers would be glad to purchase copies in good condition of Nos. 1 and 5, Vol. I, Nos. 3 and 5, Vol. V, No. 12, Vol. VII, and No. 2, Vol. IX.

SOME PROBLEMS FOR CONSIDERATION

By R. E. RIX, F.D.S. R.C.S., M.R.C.S., L.R.C.P.

I AM very conscious of the honour of having the opportunity of giving The Northcroft Memorial Lecture, but I must admit it has caused me some anxiety during the past few months. In the interest of prevention of cruelty to Northcroft lecturers I feel they might well be confined to whole-time teachers sustained by the facilities of their departments. For the protection of the members of the Society I would also suggest that lecturers should have had not less than four offspring to help keep their feet on the ground. I should not qualify under either of the headings. As time has passed the fascination of seeking for aetiological factors has been overshadowed for me by the more immediate problems of making treatment available where it is needed among a child population in England and Wales of 5½ millions in the age-group of 8-15 years. To care for the shape and relationship of the dental arches so that these children may grow up with the expectation of having teeth that are presentable and as durable as the onslaughts of civilization will allow, is a tremendous task.

We have come to appreciate in broad outline the reasons for the variations seen in the dentition. We know that they are infinite, and it is pretty certain that the continued search for aetiological factors is not going to lead to the discovery of some panacea. No biochemist is going to improve the assortment of our genes, and we have not yet arrived at a stage of sufficient docility to submit to plans of the eugenicist. I think, therefore, that we must begin to place more emphasis upon thoughts of making treatment more readily available and of simplifying it wherever possible.

I would like to try to make the whole subject of orthodontics less esoteric than it has become. Much will be lost if orthodontics drifts towards an isolated speciality.

Help in reversing the trend could be gained at undergraduate level, though admittedly it would take some time to become apparent. It is not easy for an undergraduate to acquire and digest the information which is now presented to him. What with teleradiology, geometry, graphs, statistics, electromyography, genetics, as well as anatomy and physiology, there are opportunities for him to be overwhelmed. The art of teaching lies in maintaining an appetite for knowledge, and at present the orthodontic diet tends to be fatty. Another difficulty is a disturbing division in the teaching of the basic sciences. What is *considered* an adequate background for the study of dental surgery is not enough for an adequate background for orthodontics, and it would be beneficial in all respects if a comprehensive syllabus could be drawn up and presented to all students. It could be done if undergraduates had the advantage of receiving their preclinical tuition in departments which include whole-time teachers in dental anatomy and physiology, with prospects of attaining the highest academic status. Teachers of high calibre need to be attracted to these appointments. They should be assisted by part-time teachers with clinical experience, including orthodontic experience. The departments would then provide the all-inclusive formative education upon which clinical training would be built no matter what the particular clinical training was; whether it was prosthetics, periodontology, orthodontics, or general dental surgery.

I cannot think of another single project which would so increase the stature and the usefulness of dental surgeons in the long run in the whole range of their activities.

The undergraduate, during his clinical training, would then not need to spend so much time listening to his various clinical teachers giving preliminary instruction in the basic

sciences relating to their own particular speciality and he would be saved from conducting himself as though dentistry were a conglomeration of disjointed specialities.

When he enters an orthodontic department he should already know something of the points to look for in an assessment of a derangement of the dentition. His preliminary training will have made orthodontics more digestible. It will, I think, avoid some of the tidy mathematical concepts which beguile the unwary student into believing that the dentition should be made to fit. The subject will take its place logically among other subjects without unnecessary re-orientation of ideas.

Proper basic tuition would leave more time available for him to examine with his clinical teachers the innumerable variations to be met with at orthodontic clinics, and to appreciate what conditions are worthy of treatment, what improvements are desirable or possible, and to plan ways of achieving them. Courses of lectures in orthodontics are a help to orderly thinking and orderly replying to examination questions, but they go in one ear and out of the other in the absence of adequate chairside instruction.

Time would also be available for the designing of appliances and the actual treatment of patients under supervision. By his own efforts the undergraduate should sense the response of teeth to pressures which he has applied himself. It promotes interest and encouragement. I have seen too many useful people turned out by undergraduate schools to agree with those who would prefer that orthodontics should be solely a postgraduate study. I agree entirely with the observations which were made before this Society (Hovell, 1956).

The country is beginning to be dotted with orthodontic consultants, an important part of whose duties is to provide what, in essence, is postgraduate instruction for those who seek it. Quite apart from any formal talks or demonstrations that consultants have the opportunity to give, there are many chances of amplifying bare statements of treatment plans in letters of advice with explanatory asides. Consultants' letters covering a course

of treatment over a period of two years can be time consuming, but they are extremely valuable. The more revealing they are the less frequently in the end will practitioners need to seek advice upon similar malocclusions.

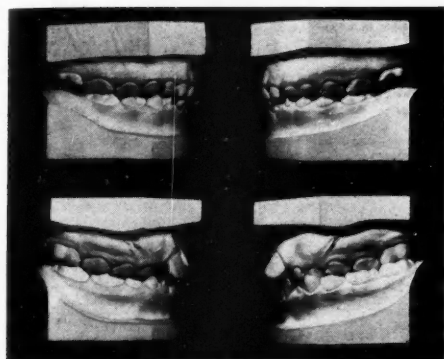
As far as I can see the main hope of improving the spread of orthodontic treatment for deserving cases lies in the well-informed general practitioner. He is accessible, geographically speaking. He is the best judge of the desirability of treatment in all the circumstances; he has the best opportunity of instigating treatment at the most advantageous time; he continues to look after the teeth during treatment and he has to live with the mouth after treatment is finished. I also like to think he would prefer not to allow the range of his activities to shrink.

The diversity of treatment that can be carried out with removable appliances is very considerable, providing they are designed and handled with precision and providing the onset of treatment is well timed. Their potential has probably not been fully exploited and it is also probable that opportunities are sometimes missed to change tactics which would permit removable appliances to be used instead of fixed ones to produce a satisfactory result. To enlarge the scope of removable appliances gives the general practitioner and his technician the chance to stay on more familiar ground. There is no hope of working up expertise in treatment with fixed apparatus. Such treatment requires postgraduate training.

Another easement seems to be possible for those at undergraduate level. I am inclined to think that it is easy to overburden the subject with observations under the heading of soft tissue behaviour and dental base relationship. I have taken a great interest in the soft tissue environment of the dental arches and have tried to keep up with the literature. Most of us are satisfied that it makes a contribution to the shape and relationship of the arches (*Fig. 1*), but its subtleties are difficult to understand. While we are still in the process of clarifying our ideas, as I think we are, I would not want to lead an undergraduate too far into this subject.

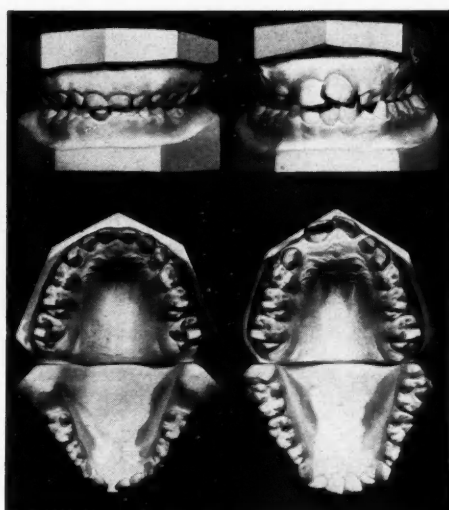
Examination candidates from undergraduate schools are often much confused. How often have I listened to them volunteering the information that the circumoral muscles show

rest, and therefore apart, the relatively short upper lip does not provide adequate coverage of the upper incisors (Ballard, 1956). This lack of coverage in the presence of

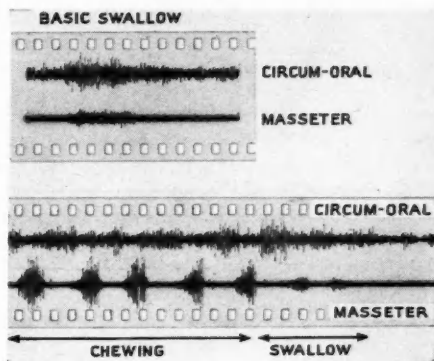


A

Fig. 1.—A, B, Lateral and occlusal views of case showing the effect of an adverse soft tissue environment on the dentition as it changes from the deciduous to the mixed dentition. C, Electromyogram of this case indicating the tooth-apart swallow with the circumoral contraction.



B



C

excessive contraction in Class II, division 2 cases when I cannot see it. I know they are arguing backwards, because the upper central incisors are retroclined. They forget that one would equally expect to find the upper central incisors to be retroclined without excessive contraction if the front of the lower arch is relatively retruded. I have often heard talk of a poor prognosis of a case with an overjet with its expected commensurate degree of overbite, because of a tongue thrust during swallowing, which will not, in fact, prevent correction. There is also confusion over the effects of incompetent lips. The literature is conflicting on the point, especially in this exploratory period when hypotheses have to be abandoned from time to time. There is one which is current which I find difficult to follow. It is that an overjet is created by a combination of two sets of circumstances. First, when incompetent lips are sealed, the contraction of the mentalis muscle causes the lower incisors to be more lingually inclined than they otherwise would be. And secondly, when the lips are at

anteroposterior crowding permits, it is said, the upper incisors to be more proclined than they otherwise would be. But one sees Class I cases with an overjet with no anteroposterior crowding when lips are incompetent. The explanation does not seem to take into consideration all the circumstances. These children

separate their teeth during swallowing. The front of the tongue is moved forward over the lower incisors, with its ventral surface making contact with a contracted lower lip while its

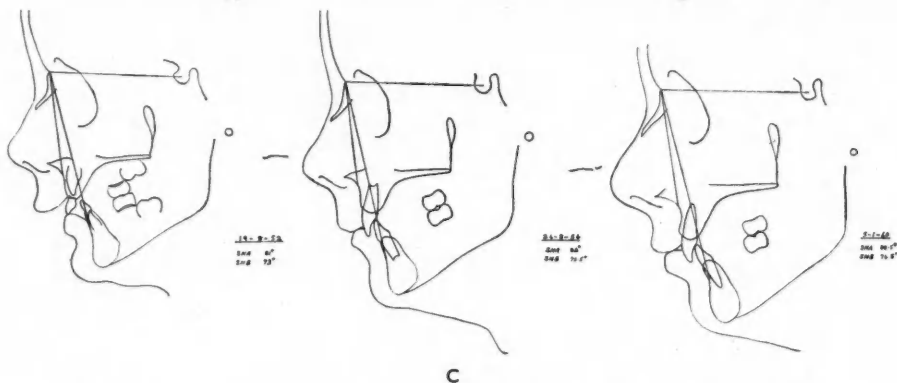
lost its support. It has been moved forwards and support has been transferred to the upper incisors. The mentalis-assisted lower lip, in contact with the ventral surface of the front of



A



B



C

Fig. 2.—Profile views of patient in A, 1952, and B, 1960, showing considerable improvement in lip posture with the passage of time and the correction of a Class II malocclusion, using the Andresen monobloc. The general behaviour of the oro-facial muscles in swallowing was noticeably improved. C, Lateral X-ray tracings of this patient.

dorsal surface lies against the palatal surface of the upper incisors. A situation then arises when it is feasible to think that an overjet can be created. The front of the tongue is not lying behind the lower incisors. They have

the tongue, is pressing back against the unsupported lower incisors. These conditions are the same as those I once described during that variety of swallowing behaviour with teeth apart which I called the infantile type (Rix,

1946, 1952), and which Gwynne-Evans and Tulley (1955) called the visceral type. I like their phrase. The combination of incompetent lips and of swallowing with the teeth apart, which produces repeated and quite forceful pressures, is likely to create more disturbance in the incisor relationship than any that can be deduced from the behaviour of incompetent lips alone.

Are we right in assuming that incompetent lips will always remain incompetent? It would be valuable to discover by scientific method whether the effort to seal such lips ever at least becomes less (disregarding any reduction of effort which would follow treatment to improve the anteroposterior incisor relationship). A reduction of effort would presuppose some change in lip morphology. From clinical observations I would say that effort does become less sometimes. The boy illustrated in Fig. 2 revealed no effort by the time he was 13½ years old.

I would like to be able to clarify another problem, which is perhaps only a question of terminology. There is the child who does not necessarily have incompetent lips, but who habitually maintains a contact between the tongue and the lower lip. The contact makes for no economy of effort in maintaining a lip seal, as one sees in operation in a child with incompetent lips. It is not a trick to sustain a lip seal. It hinders occlusal rise of the incisors. There is an anterior open bite with a varying degree of overjet. During swallowing, the cheek teeth are almost invariably separated and the tongue thrusts forcibly against the lower lip, which is tensed to counter the thrust. There is a frequent tendency to lisping speech. This is the tongue behaviour that Ballard (1955) has called "the endogenous tongue thrust", but since the tongue's resting position is in contact with the lower lip should one characterize the anomaly as a *thrust*?

When comparing this behaviour with the visceral type it seems to be a step more removed from the precision of normal behaviour, and creates a more unfavourable environment for the incisors. The term "endogenous tongue thrust" fixes a label on an isolated sign and

shuts the door on a broader view. A sign is highlighted in an ontogenetic and phylogenetic void. If I am looking at the whole syndrome in the right way it would be right to use a more comprehensive term.

When one sees a straightforward anterior open bite with no anteroposterior error in early years one is confident that, in the absence of a high Frankfurt-mandibular-plane angle and in the absence of a persisting lip, the condition will gradually improve without treatment. The size of the tongue appears to be too large in relation to the oral cavity and to be hindering occlusal rise of the incisors. It is particularly noticeable at the time of eruption of the permanent incisors, when they need to travel far if they are to span the increasing intermaxillary gap. The tongue, like the eyes and brain, is relatively large in the early years, and with age becomes reduced in proportion. It is not unreasonable to suppose that there is sometimes a lack of precise timing in proportional reduction of tongue size, and on the face of it one hardly needs to go further than to regard the simple anterior open bite as due to a temporary maladjustment in tongue morphology. The maladjustment can be superimposed upon any variety of unwanted behaviour in which the tongue shares, and can aggravate the adverse moulding effects of that behaviour in early years. In the absence of a temporary maladjustment, the normal diminution in the proportions of the tongue reduces the contribution that it can make towards those adverse effects. It is comforting to remember that age can take some of the sting out of adverse behaviour.

The gradual uprighting of normally related upper and lower permanent incisors is the natural tendency during the period of growth. It helps in turning the so-called convex profile of the lower third of a child's face into the straighter profile of an adult. This, I think, is a further indication of the continued reduction in tongue proportions. The alternative which has been suggested is that the continuous muscular band external to the arches ceases growing before skeletal growth has finished. The suggestion seems less feasible.

Björk (1947), in *The Face in Profile*, demonstrated that the angle between the long axes of the upper and lower incisors showed an average increase of some 9° between the ages of 12 and 21–22 years (Fig. 3). Taking the occlusal plane as a base line he showed how

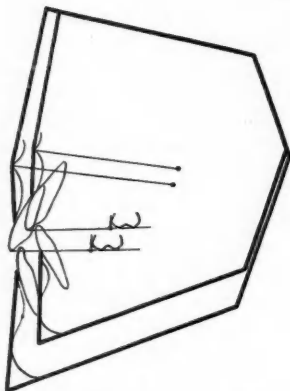


Fig. 3.—Superimposed tracings of case at 12 years and 21 years of age. (From "*The Face in Profile*", by kind permission of Professor A. Björk.)

much the upper and lower incisors contributed respectively to this change. In round figures, the upper incisors become more upright by 6° and the lower incisors by 3° . It is useful to recall this general tendency when one is confronted with a dentition with just enough bimaxillary proclination for parents to have raised a query about orthodontic treatment.

If one analyses the change in incisor angulation using the *mandibular* plane as a base line, it can be seen that the lower incisor angle changes more than the upper. The change of the lower incisors accounts for most of the increase of 9° in the angle between upper and lower incisors. This finding strengthens our caution in carrying out treatment aimed at proclining lower incisors, even when we think that the soft tissue environment is satisfactory. Lower incisors are sometimes subjected, incidentally, to forward pressure, while other aims are being pursued, but wily clinicians know that the avowed intention should not be that the incisors should stay forward.

Björk's work brings out a further interesting thought, which has a bearing, I think, on previous remarks about the waning effects of an adverse soft tissue environment. He found that those children with an overjet at 12 years had a reduced overjet at 21–22 years, which was produced by the lower incisors going against the general trend and becoming more proclined. This finding, by the way, cannot be a justification for proclining the lower incisors as part of treatment to correct an overjet, for, statistically, they are proclined only in the presence of an overjet.

I would like to turn to some points dealing primarily with hard tissues. I wonder how vital it is for treatment planning to make a prior assessment of the dental base relationship in the anteroposterior plane? I am not doubting the necessity of being aware of the Frankfurt-mandibular-plane angle and the implications attached to extremes of angulation. I am thinking only of anteroposterior relationship of the dental bases. It would help undergraduates enormously if it could be side-tracked and it would also make for easier communication between the initiated and the mass of general practitioners who do not know what it is all about, and who will not be replaced under 20–30 years. As far as the hard tissues are concerned, plans for treatment must be based on the occlusal or morsel perimeter of the lower arch—not the arch at gum level or apical level. I have so often heard a candidate in the final examination put up a muddle-headed show at assessing clinically the dental base relationship and then proceed to describe a perfectly sensible line of treatment which, did he but declare it, was based on the lower morsel arch.

To use the lower morsel arch in this way does not entail being ignorant of the factors which determine the degree of overbite, for it is the anteroposterior relationship of the lower incisor edges to the upper incisors that counts. The apical position of the lower incisors can vary in the anteroposterior plane while a given point of contact of their incisal edges is maintained with the upper incisors. It is maintained by variations in the slope of the lower incisors. We are already aware of the

several conditions governing lower incisor inclinations.

Again, the acceptance of the lower morsel arch as a basis does not prevent easy assessment of the final slope of the upper incisors after, for instance, correcting a Class II, division 1 dentition. All the information required is there on the surface for one to examine. One can weigh up the desirability of simple tilting movement for incisor retraction or of bodily movement.

The use of the lower morsel arch as a basis for treatment planning will not, however, direct treatment towards those alleged realms of pulchritude which result from having lower incisors at an angle of 62° to the Frankfurt plane, and contriving treatment of the upper arch to comply with this lower requirement. Although this treatment is popular in the United States, we do not seek to alter the profile to this extent here. It assumes that a considerable disturbance of the whole dentition is justifiable and that we all think alike about beauty. One tends, I find, to get tired of green peas now that they can be obtained out of a tin all the year round.

With the lower morsel arch in mind, either as it stares the undergraduate in the face before treatment begins, or as he envisages its size and its ultimate position in the incisor region after any desirable reduction in the number of lower teeth has been made, he can be made to appreciate, without great difficulty, what conditions need to be satisfied to arrange upper teeth around the lower morsel perimeter as closely and as smoothly as is feasible with the probability of stability.

The assessment of the dental base relationship with X-ray or by clinical examination is, I find, very prone to encourage the unwary to regard orthodontics as a mathematical discipline with some technique thrown in. It deflects thoughts from the one feature of an individual's dentition, namely the lower morsel arch, around which treatment plans for that individual have to be considered (Fig. 4).

The morsel arch still remains a working basis whether the patient is Anglo-Saxon, Middle European, or of any other type.

If there is a thread running through the first part of this paper it may perhaps be seen as a plea for some simplification of a subject which nowadays risks being regarded as an

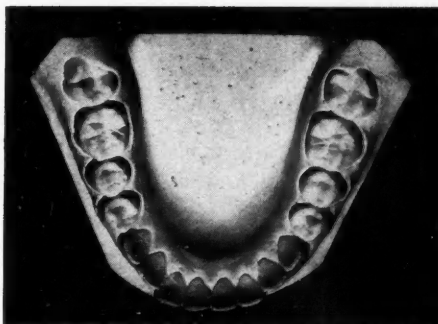


Fig. 4.—The lower "morsel" arch. Case showing good alignment with six lower incisors present.

exclusive speciality. The curriculum of undergraduate schools makes for early division of instruction. The machinery at work to produce candidates for orthodontic consultant appointments unwittingly endorses the exclusiveness. The American example subtly persuades that orthodontists are a separate breed. I cannot believe that the subject should be so discreet. Orthodontics should surely remain a part of the work of the general practitioner, and his handling of orthodontic problems will become more valuable as his experience of general practice lengthens, providing he has not been frightened off the subject in his early years.

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[To be continued.]

ABSTRACTS FROM OTHER JOURNALS

A New Method of Splinting Loose, Fractured, and Evulsed Teeth

This method has the following advantages over all others: the sole strand of wire can be applied quickly, easily, and immediately; edentulous areas may be incorporated and the appliance is adjustable, comfortable, easily cleansable, and non-irritating; it is usable for long periods of time and is applicable to any tooth which for any reason requires to be stabilized temporarily. The only disadvantages are the possibility of the wire breaking during manipulation, and lack of aesthetics. The latter may be overcome by covering the wire with self-cure acrylic resin, but this must not be allowed to contact tooth enamel for too long because of the possibility of etching.

The kit required is a strand of 30 gauge stainless steel wire; wire cutters; a pair of hemostats; and a broach-holder carrying any sort of broach which has had its length reduced by half and the remaining half of the broach in the holder bent at its middle to an angle of 115°, and its end sharpened.

The technique is described of stabilizing in its socket an injured upper incisor. A 10-in. strand of wire is threaded from the palatal side through the interproximal space between the right first and second premolars. This outer (guide) wire is placed along the facial surfaces of the teeth until it reaches the mesial of the left molar where it is held. The palatal or working wire is now threaded through the space between the right first premolar and canine under (gingivally to) the guide wire and out to the buccal. The working wire is then carried over (occlusally to) the guide wire, re-threaded through the same interproximal space, and pulled to position against the guide wire. This threading from the palatal and re-threading from the buccal is repeated at the space between the canine and lateral, but now the working wire is placed just under (gingivally to) the contact point. When the central-lateral space is reached the re-threading wire is placed over (occlusally to) the contact

point as well as over the guide wire. Similarly the central-central and left central-lateral spaces have the working wire placed over the guide wire and over the contact point. The wire re-threaded to the palatal of left lateral and canine space is placed over the guide wire and just under the contact point. The remaining teeth are treated in the same way as were the teeth on the right side until the distal of the first premolar is reached, when the two ends of wire are twisted together several times, the excess cut off, and the cut end tucked into the interproximal space gingivally.

The tip of the modified broach is now inserted beneath the working wire which has formed a loop over the guide wire between the right first premolar and canine. The wire is pulled buccally and tightened palatally against the teeth. This is repeated at all the spaces. Returning to the first loop between right first premolar and canine the broach is used to make one half-turn of the loop. This is repeated at all spaces until the wires are taut; one or two turns at each loop may be required. Any projecting loops are tucked in. When an edentulous space is encountered both wires are twisted together across the space and until the next tooth is contacted. If an anterior tooth is missing a temporary acrylic tooth may be fused to the splint.—BEHRMAN, S. J. (1960), *N. Y. St. dent. J.*, 26, 287.

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The Commonwealth Bureau of Dental Standards

The Bureau has recently undertaken an investigation into the properties of most materials used in dental practice. It neither approves nor endorses a product; it merely expresses an opinion based on samples only of the product which it has tested.

The present paper discusses zinc and copper cements used for cementation purposes and the silicate and silico-phosphate materials.—GRIFFITH, J. R. (1960), *Aust. dent. J.*, 5, 285.

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